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May 1, 1926

McGraw-Hill Publishing Company, Inc. Price Twenty Cents per Copy

ELECTRIC RAILWAY JOURNAL



Okonite Tapes

Make Dependable Joints

OF unvarying quality—made to the highest standard, OKONITE TAPES can be depended upon to give a service that will be thoroughly satisfactory for years to come. Their use means permanence and economy on your lines.

"Okonite" Tape (Splicing) "Manson" Tape (Friction)
Dundee "A" & "B" Tapes (Friction)

Illustrated Booklet "Splices & Tapes for Rubber Insulated Wires" on Request

The Okonite Company
The Okonite-Callender Cable Company, Inc.

Factories: PASSAIC, N. J. PATERSON, N. J.
Sales Offices: New York Chicago Pittsburgh St. Louis Atlanta Birmingham San Francisco Los Angeles Seattle

Pettingell-Andrews Co., Boston, Mass.
F. D. Lawrence Electric Co., Cincinnati, O.
Novelty Electric Co., Phila., Pa.
Canadian Representatives:
Engineering Materials Limited, Montreal
Cuban Representatives:
Victor G. Mendoza Co., Havana

Write *to our nearest office for samples and booklets.*





13 new cars placed in service by the Youngstown Municipal Railway combine many advanced features. Seats are cushioned and leather covered. Automobile type dome lights provide restful lighting. All control equipment is concealed. Battleship Linoleum covers the floors. These cars have a capacity of 44 passengers, and are operated as one-man cars, replacing much heavier two-man cars.



—in Youngstown

The Car of a New Day!

SUPPOSE YOU lived in Youngstown. Suppose each evening as the whistles blow and surging masses are homeward bound, the door opened to a clean, inviting car like this. Suppose, inside, you could settle back in a leather-covered cushion seat, and read your paper in comfort, while silent, nimble motors speed you safely homeward—

Wouldn't YOU ride the trolleys?

Youngstown people DO ride. Bright, modern cars invite them; cars that combine the comforts of the private automobile with the safety and convenience of trolley operation; cars that attract riders because they are attuned to modern tastes.

For this is a new day. The people who live in modern homes—who enjoy every modern convenience—who own modern automobiles, these people can buy and will buy MODERN transportation—in Youngstown or in Your Town!

The new cars are completely equipped with Westinghouse 508-A motors, 25 hp. each, and Type K control.



Discuss your problems with the Westinghouse Representative.

Westinghouse Electric & Manufacturing Company
East Pittsburgh Pennsylvania
Sales Offices in All Principal Cities of the United States and Foreign Countries

MEMBER NEMA AERA 1926

Westinghouse

X87853

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ELECTRIC RAILWAY JOURNAL

CHARLES GORDON, *Editor*

[illegible] LAKE
Editor

GEO[illegible] MacMURRAY
News Editor

EDWIN F. THAYER
Assistant Editor

PAUL WOOTON
Washington Correspondent

ALEX McCALLUM
Editorial Representative
London, England

Vol. 67
No. 18

Pages
747-788

CONTENTS

MAY 1, 1926

Editorials 747

Dallas to Spend $1,500,000 in Service Extensions .. 748

Arbitrary fixed-fare theory broken in new franchise amendment that establishes a 7-cent fare. The company will spend more than $1,000,000 this year for new cars, track and paving, and nearly $500,000 to retire loans for work completed or under construction.

Campaign for More Traffic Brings Results in Birmingham 753

The direct method of advertising included the use of newspapers, billboards, car signs and moving picture reels. Coincidentally, efforts were made to improve the service in many ways. Trainmen enlisted as ride salesmen.

Standard Traffic Signs Used in Winnipeg 756

BY H. G. STEWART.

Buses Supplement Rail Transportation System in Boston 757

BY EDWARD DANA.

Rapid development of auxiliary bus service by the Boston Elevated Railway has occurred during the past two years. In part this service replaces that formerly given by street cars, but considerable new route mileage has been added.

Standardized Overhead for the Canadian National Railways 759

BY W. H. C. VILBERS.

The recently electrified Grantham division of the Niagara, St. Catharines & Toronto Railway employs a system suitable for various voltages and operation with either pantograph or trolley collectors.

Citizen vs. Street Railway 761

BY ED WOLFF.

The public is not a mass but an individual raised to the *n*th power, and public opinion is therefore only a greatly enlarged private opinion. It is not enough to do our best, but the public must be told our story.

Traffic Increased by Use of New Cars 763

Modernization of rolling stock of the Morris County Traction Company has attracted additional riding and reduced operating expenses. Taxes and paving charges amounting to 18 per cent of gross receipts endanger continuance of railway service.

Hose Bridges Adopted in Pittsburgh 765

Bus Discussion in National Municipal Review 765

Co-operation between Hotel System and Electric Railway 765

Maintenance Notes 766

New Equipment Available 768

Association News and Discussions 769

American Association News 770

News of the Industry 771

Recent Bus Developments 775

Financial and Corporate 777

Legal Notes 783

Personal Mention 784

Manufactures and the Markets 786

Service to Industry

ON PAGES 42-43 of this issue is another of the McGraw-Hill full-page advertisements that are being published in prominent daily newspapers in important industrial centers and in magazines devoted to the publishing business.

This particular advertisement is of special interest to readers of ELECTRIC RAILWAY JOURNAL. It pictures in a striking way the resources back of the JOURNAL. It dramatizes the fundamental basis on which McGraw-Hill publications have been built — service to industry.

With 125 editors traveling 700,000 miles a year through industry and with 542 special news correspondents scattered over the world, ELECTRIC RAILWAY JOURNAL together with its associated publications draws on this wide contact and experience in interpreting industrial developments.

You, Mr. Railway Operator, are one of the 220,000 subscribers who read 10,000,000 copies of McGraw-Hill papers annually. Back of the pages of the JOURNAL are the enormous resources of this unique organization built on an ideal. Like other McGraw-Hill publications it is devoted to the upbuilding of its industry and points the way toward bigger opportunity for its readers.

McGRAW-HILL PUBLISHING COMPANY, INC.

Tenth Avenue at 36th Street, New York, N. Y.

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LONDON:
6 Bouverie Street, London, E. C. 4

Member Associated Business Papers, Inc.
Member Audit Bureau of Circulations

MEMBER A.B.P. INC. AERA C.I.C. ASSOCIATION
1926

Cable Address: "Machinist, N. Y."

Publishers of
Engineering News-Record
American Machinist
Power
Chemical and Metallurgical Engineering
Coal Age
Engineering and Mining Journal-Press
Ingeniería Internacional
Bus Transportation
Electric Railway Journal
Electrical World
Industrial Engineer
Electrical Merchandising
Radio Retailing
Journal of Electricity
(Published in San Francisco)
American Machinist—European Edition
(Published in London)

The annual subscription rate is $4 in the United States, Canada, Mexico, Alaska, Hawaii, Philippines, Porto Rico, Canal Zone, Honduras, Cuba, Nicaragua, Peru, Colombia, Bolivia, Dominican Republic, Panama, El Salvador, Argentina, Brazil, Spain, Uruguay, Costa Rica, Ecuador, Guatemala, Chile and Paraguay. Extra foreign postage to other countries $3 (total $7 or 28 shillings). Subscriptions may be sent to the New York office or to the London office. Single copies, postage prepaid to any part of the world, 20 cents.

Change of Address—When change of address is ordered the new and the old address must be given, notice to be received at least ten days before the change takes place.

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SAVING THE RAIL SAVES THE RAILWAY

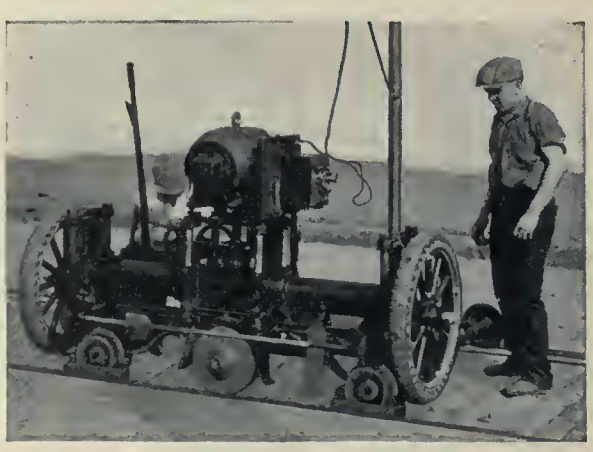
The only way—

It is a pleasure to quote Mr. Nels C. Rasmussen, Supt. of Railways, Wisconsin Valley Electric Company:

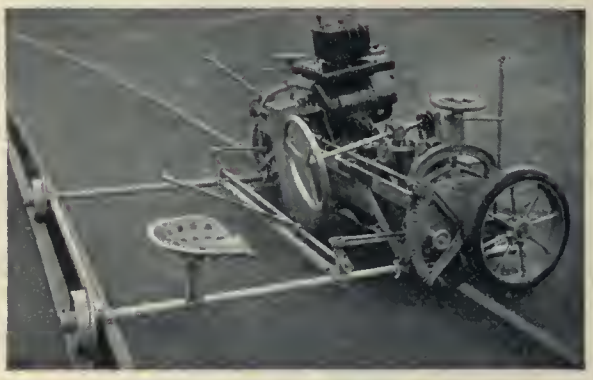
> "It is through the pleasing appearance as well as comfortable, speedy and safe transportation that we will get our message across to the public, and that only in this way can we expect to get patrons enough to make our industry profitable. 'Master Mechanic' wonders where the money to improve equipment is to come from. It is by the improvement of equipment and track that patronage is going to be increased, but occasionally we find some executive who thinks he must either curtail service or cut down the appropriation for maintenance of equipment as soon as the seasonal drop in patronage occurs.
>
> Such men are losing track of the fact that we are at a dawn of a new era in transportation. The standard of living in our country, we are told, is constantly ascending to higher levels. If that is so it holds true equally well in transportation."

Never was better advice offered. Indeed, "comfortable, speedy and safe transportation" is the only kind salable at a profit today. And only on well-maintained track can rail transportation be comfortable, speedy, safe and silent at the same time. Such track is readily available. The equipment here shown produces it.

Now is the time to order for early spring delivery.



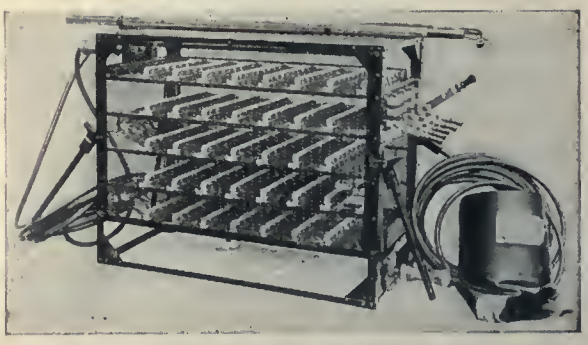
"Imperial" Track Grinder



"Improved Atlas" Rail Grinder



Reciprocating Track Grinder



"Ajax" Electric Arc Welder

Railway Track-work Co.

3132-48 East Thompson Street, Philadelphia

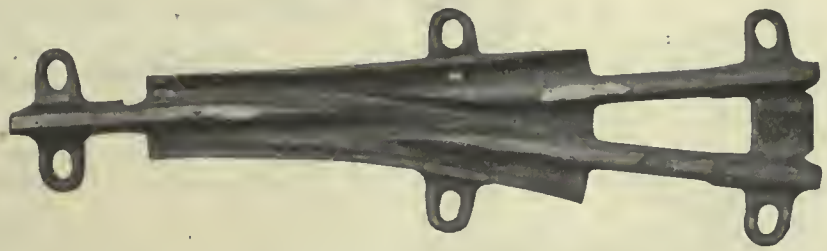
AGENTS:

Chester F. Gailor, 30 Church St., New York
Chas. N. Wood Co., Boston
Electrical Engineering & Mfg. Co., Pittsburgh
H. F. McDermott, 208 S. LaSalle St., Chicago
Equipment & Engineering Co., London
P. W. Wood Railway Supply Co., New Orleans, La.
Frazar & Co., Japan

1041

SAVING THE RAIL SAVES THE RAILWAY

Do You Get Such Service as this from Trolley Frogs?



Above is shown an actual unretouched photograph of an O-B Type BC Frog which was removed from service after 652,500 cars had traversed it. Can you duplicate such a performance record with the type of frog you are using?

You can with O-B Type BC Frogs

MORE than half a million car passes is by no means an exceptional service record for O-B Frogs. The average tests on five big properties was within a few thousand of the half million mark. Many individual O-B Type BC Frogs have gone way past this figure.

The big reason for long life is in the liberal height of the runners and their extended overlap at the center of the frog, which prevent the wheel flanges from running on the pan. There's no jump, no arc, and an easy *smooth* transition all the way through, on the straight or on the angle.

Your trolley frog replacements will be fewer and farther between, when you standardize on O-B Type BC Frogs.



O-B Cam Tips

(Renewable Bronze)

Are provided on all modern O-B Frogs, Cross-Overs and Section Insulators. They hold the wire tightly, never become loose or troublesome in service, afford a smooth transition from wire to casting, and are easily and quickly renewed when worn.

Ohio Brass Company, Mansfield, O.
Dominion Insulator & Mfg. Co., Limited,
Niagara Falls, Canada

68B

Ohio Brass Co.

PORCELAIN INSULATORS LINE MATERIALS RAIL BONDS CAR EQUIPMENT MINING MATERIALS VALVES.



Safeguard— operation of those new cars!

Provide real safety by means of Golden Glow Headlights on the industry's twenty-eight thousand new cars.

The *glass reflector* projects a soft golden beam that easily penetrates fog, dust, rain, mist and the natural darkness of night.

And they wear indefinitely.

Send for full information.

ELECTRIC SERVICE SUPPLIES CO.

PHILADELPHIA
17th and Cambria Sts.

NEW YORK
50 Church St.

CHICAGO—Illinois Merchants' Bank Bldg.

PITTSBURGH
1123 Bessemer Bldg.

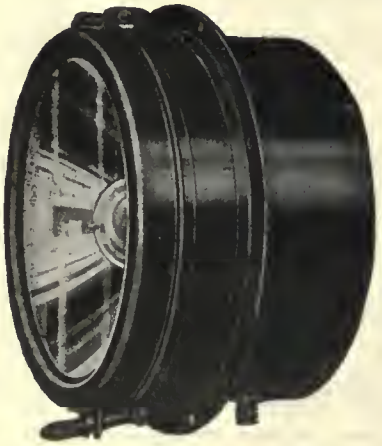
BOSTON
88 Broad St.

SCRANTON
316 N. Washington Ave.

DETROIT: General Motors Bldg.

Lyman Tube and Supply Co., Ltd., Montreal, Toronto, Vancouver

GOLDEN GLOW HEADLIGHTS



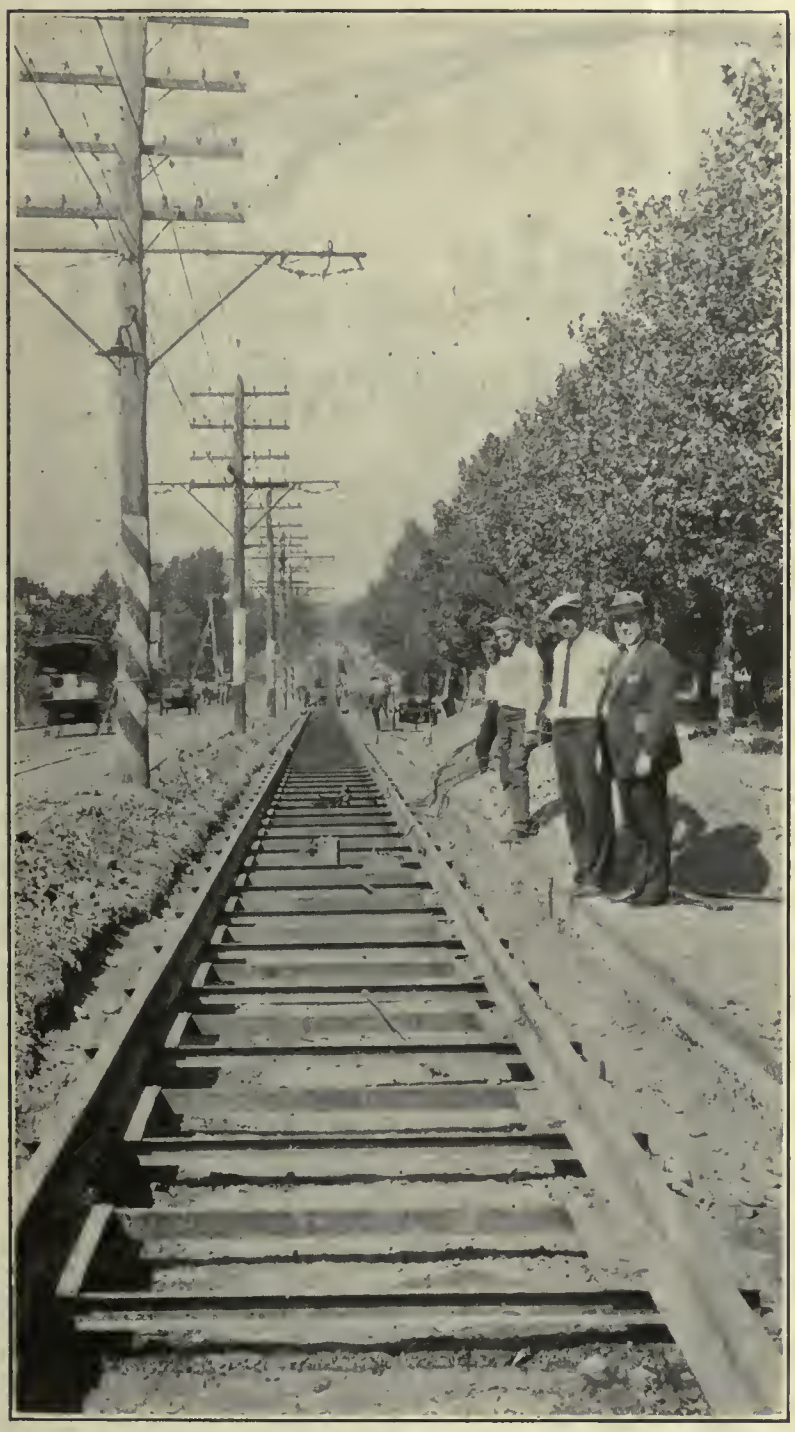
Dash Type for Railway Cars

The Golden Glow reflector will not scratch, tarnish or corrode. It is a permanent reflector and easy to keep clean.

Golden Glow Headlights are made in various styles and sizes to suit any requirements—for either cars or buses.



Golden Glow Headlights for Railway Cars



Lay, Align and Surface Track for 43 cents a foot

A detail of the savings with Steel Twin Tie Construction is in the efficiency possible in the above operations.

The definite reasons for this saving, as compared with the cost with wood ties (often as much as twice this figure) are as follows:—

30 Per Cent. less tie weight to handle 880 Twin Ties as compared with 2,640 wood ties, each of approximately the same weight.

30 Per Cent. fewer rail fastenings than spikes of the jaw and key type which are quick, safe and simple.

No gauging required. Twin Ties come punched to exactly your rail and track gauge.

Labor of aligning reduced by Twin Tie construction method of blocking rail to approximate line, before fastening on ties.

This and many other advantages of Twin Tie Construction will save money on your 1926 track work.

Let us quote and send detailed track cost figures from 1925 work.

The International Steel Tie Company

Cleveland, Ohio

Steel Twin Tie Track

Renewable Track—Permanent Foundation

Signals
and their Diversified Applications.

Have you more than scratched the surface to uncover available means of protecting and speeding up your traffic, and are you experiencing delays or perhaps accidents which might be eliminated by the use of one or more of the following means?







1.—Automatic semaphore or color light block signals, controlled by continuous track circuits.

2.—Electro-pneumatic, electric, electro-mechanical, or purely mechanical interlocking systems at terminals or at grade crossings with other railway lines.

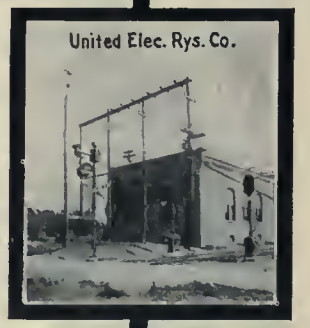
3.—Highway crossing protective devices of flashing color light, wigwag and audible types or combination of same.

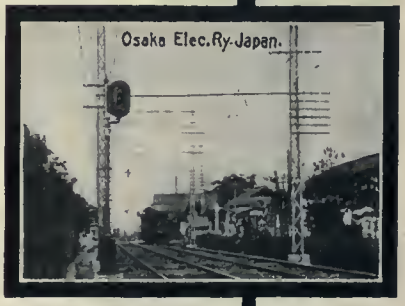
4.—Remotely controlled switches at outlying sidings.

A statement of your problem places you under no obligation and if it appears to our engineers that your conditions can be improved by installation of our materials, we shall be glad to furnish complete details.

Electric Railways which are large users of Union automatic signal and interlocking systems are:







Chicago, Lake Shore & South Bend Ry. Co.
Chicago, South Bend & Northern Indiana Ry.
Kansas City, Clay County & St. Joe Ry. Co.
Washington, Baltimore & Annapolis Elec. R. R.
Interstate Public Service Co.
Pacific Electric Ry. Co.
Illinois Traction System
United Elec. Rys. Co.
Scranton & Binghamton R. R. Co.
United Railways & Elec. Co.
San Francisco-Sacramento R. R.
Northern Texas Traction Co.

Trade Mark

Union Switch & Signal Co.

Trade Mark

SWISSVALE, PA.

The Versatile Material—



WABCO Packing Cup



WABCO Cylinder Head Gasket



WABCO Triple Valve Gasket



WABCO Hose Coupling Gasket

WABCO

By a process distinctively our own—developed through years of study, research, and experiment — we have perfected a special composition, called WABCO, which has proved to be superior to leather and ordinary rubber for gaskets and packings in air brake apparatus.

This material is unique in its ability to resist elements which have been found more or less destructive to all other materials used for the purpose. It has the basic characteristics of being compact and uniform, tough, durable, and will not become spongy and sticky as ordinary rubber does.

Furthermore, since the entire process is under our control, we are able to vary the physical content and treatment of WABCO material to make it suitable for a diversity of purposes, giving it the desired degree of toughness, resiliency, and resistance to destructive elements, such as oil, grease, and high temperatures.

WABCO products are graded into four general groups. Each group is manufactured under specifications adapted to provide the best combination to meet the exact requirements of the packing or gasket.

Ask our nearest district office for complete and specific information.

WESTINGHOUSE TRACTION BRAKE CO.

General Office and Works: WILMERDING, PA.

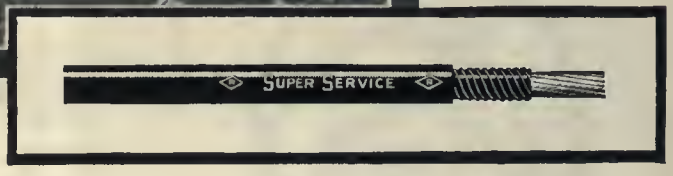
WESTINGHOUSE TRACTION BRAKES





Both illustrations show Super Service Welding Cable at the Albany Welding, Boiler and Machine Shop.

Vulcanized in steel molds under tons of pressure it withstands all kinds of abuse.



"Far Superior to other types of rubber sheathed cables"

"WE have used it on all manner of jobs such as welding steel tanks, steamboat boilers, and various emergency jobs. I am pleased to say that today the cable is in perfect condition, and apparently good for some years to come.

"The braided cables which we formerly used are not to be compared with your special Super Service Welding Cable, and we also find this product far superior to other types of rubber sheathed cables which we have used."

This statement is taken from a letter from Mr. Ray Gaul, president of the Albany Welding, Boiler and Machine Shop, after his Super Service Welding Cable had been in use for three years.

You can't beat Super Service for wear, and its extreme flexibility eliminates the need for splicing on a separate length of wire for the electrode holder.

If you have never used Super Service get a length today and try it out.

ROME WIRE COMPANY
Mills and Executive Offices: Rome, N. Y.
Diamond Braoch: Buffalo, N. Y.

New York—50 Church Street *Boston*—Little Building *Chicago*—14 E. Jackson Blvd.
Detroit—25 Parsons Street *Cleveland*—1200 West 9th Street
Los Angeles—J. G. Pomeroy, Inc., 336 Azusa Street
San Francisco—J. G. Pomeroy, Inc., 51 Federal Street

SUPER SERVICE
CORDS *and* CABLES

2542

A ROME WIRE PRODUCT



TIMES SQUARE, NEW YORK CITY

NP

FACILITATING TRAFFIC

WHEREVER National Pneumatic Door Operating Equipment is used on surface cars, subway or elevated cars, traffic is facilitated through the rapid interchange of passengers and a reduction in the standing time. A stationary car congests the traffic and produces no revenue. National Pneumatic Equipment not only saves money for the transportation agency but is welcomed by the public and by the authorities who are responsible for traffic movement.

NATIONAL PNEUMATIC COMPANY

***Executive Office,* 50 Church Street, New York**

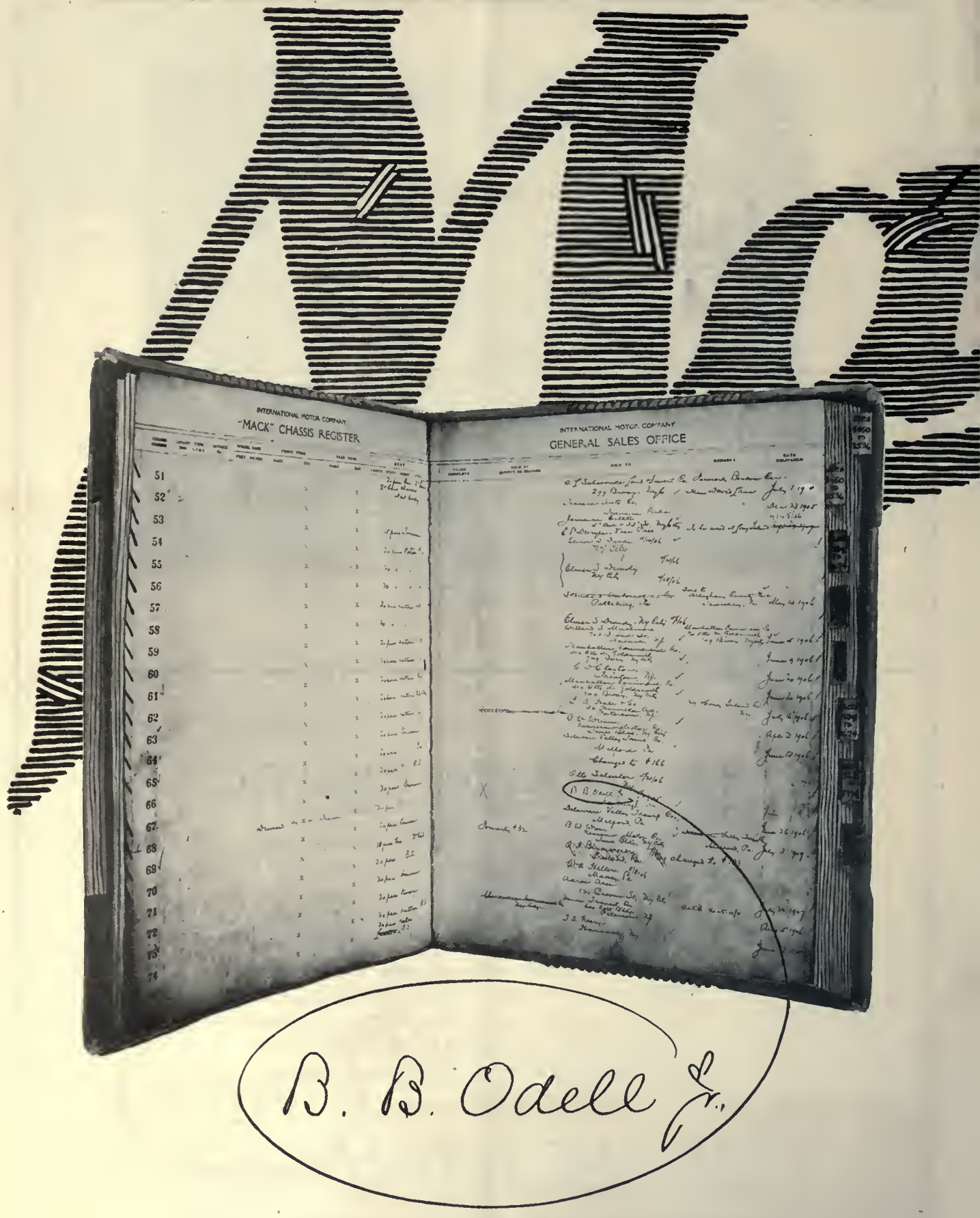
***General Works,* Rahway, New Jersey**

MANUFACTURED IN

CHICAGO
518 McCormick Building

TORONTO, CANADA, BY
Railway & Power Engineering Corp., Ltd.

PHILADELPHIA
1010 Colonial Trust Building

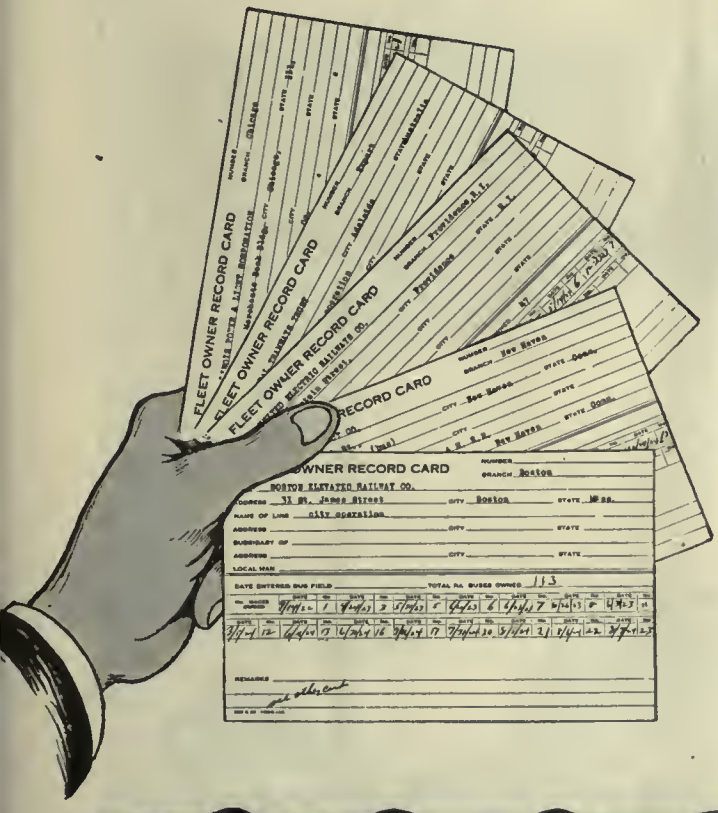


Away back in 1905 the name of B. B. Odell, Jr., appeared as a Mack customer on the pages of this old Mack ledger.

Today, acting for the Newburgh City and Suburban Railway, Inc., the same name appears as a customer for Mack Buses.

What's behind the Bus you buy?

Better records and better products



Times have changed. Just as Mack methods of keeping records have graduated from old entries in a ledger to the modern way of indicating sales transactions on a Fleet Owner Record Card, so has the design of the Mack Bus kept pace with the needs of modern transportation.

Better records and better products have developed in the Mack organization side by side. The business records used by Mack twenty years ago are as inadequate today as the early Mack buses when compared to Mack's latest models. Good in their time, both have outgrown the requirements of their day.

One thing is certain. As transportation methods establish new standards, Mack will meet them—with the right engineering design and with the right business records to keep track of all transactions and better serve fleet owners.

MACK TRUCKS, INC.
INTERNATIONAL MOTOR COMPANY
25 Broadway, New York City

Over one hundred direct MACK factory branches operate under the titles of: "MACK MOTOR TRUCK COMPANY," "MACK-INTERNATIONAL MOTOR TRUCK CORPORATION," and "MACK TRUCKS OF CANADA, LTD."

The Mack Bus



International

For the Man Who Must Explain Pole Performance

DISTINCT advantages to be gained by the use of Creosoted Pine Poles are as follows:

Greatest Strength —Longer Life
Low Annual Cost —Fine Appearance
Decay Proof —Lower Construction Costs
Fire Resistant —Low Maintenance
Resistant to White Ant Attacks

When you specify ***International*** Pine Poles, you are assured of sound timber —expert manufacture—uniformly deep penetration of high grade preservatives, plus an assurance of quality. And back of all this, an institution that stands for the best in timber preservation and that has fifty years of experience to back up its good work.

Every International Pole is permanently identified by this International Dating Nail.







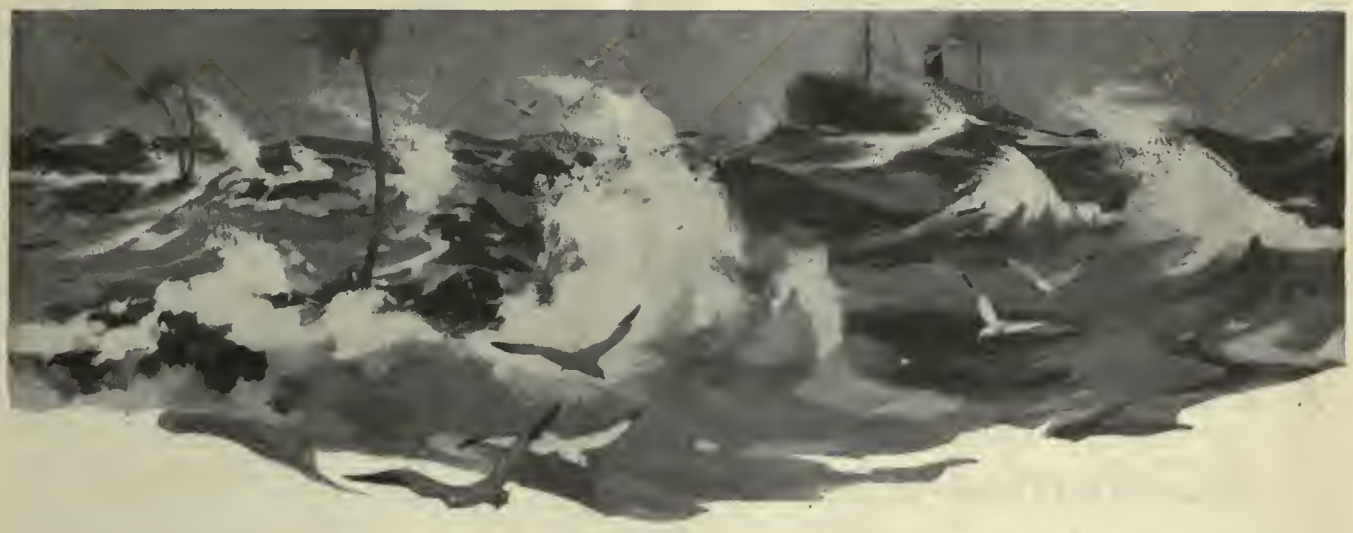
2₵6



International Creosoting & Construction Co.

General Office—Galveston, Texas

Plants: Texarkana, Texas Beaumont, Texas
Galveston, Texas



Multiply It By A Million

AN inoffensive piece of coral is too small to notice. But multiply it enough times and coral reefs hundreds of miles long are formed. The harmless individual has now developed into a real obstacle.

Considered by itself the removal, turning and replacement of one wheel seems insignificant.

But multiply that operation a million times and an appalling maintenance problem develops.

Expensive shops must be built, and skilled men assigned to run them; while revenue traffic becomes congested with needless movement of company material.

Control this situation before it gets out of hand.

If the wheels on your cars are Davis "One-Wear" Steel Wheels there is no wheel maintenance to be considered. Once under the cars they stay under.

AMERICAN STEEL FOUNDRIES

NEW YORK CHICAGO ST. LOUIS

"NATIONAL SHELBY"

SEAMLESS STEEL TROLLEY POLES

Reinforced where reinforcement is needed, without adding superfluous weight or sacrificing resiliency.



THE standard "NATIONAL-SHELBY" Poles are made from 13-gage material, as years of practical experience have shown that a lighter gage may fail by local injuries, and a heavier gage simply adds to the weight of the pole without increasing its strength to a corresponding extent. The theoretical requirement for a pole of minimum weight points out a method for increasing the strength of the pole without a proportionate increase in the weight. This method consists of the use of a reinforcement at the base end, and on the inside of the 13-gage member.

These poles are made by improved methods of manufacture, particularly in the method of inserting the reinforcement. The reinforcement is integral with the body of the pole, which adds materially to its efficiency.

Ask for Booklet—The "SHELBY" Seamless Cold Drawn Steel Trolley Pole.

NATIONAL TUBE COMPANY, PITTSBURGH, PA.

GENERAL SALES OFFICES: FRICK BUILDING

DISTRICT SALES OFFICES

Atlanta Boston Chicago Denver Detroit New Orleans New York Salt Lake City Philadelphia Pittsburgh St. Louis St. Paul

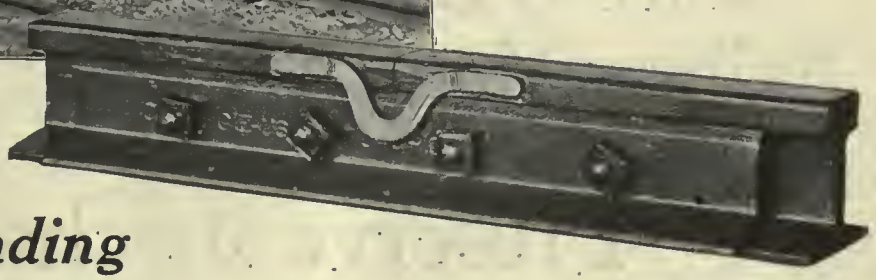
Pacific Coast Representatives: U. S. Steel Products Co. San Francisco Los Angeles Portland Seattle

Export Representatives: U. S. Steel Products Co. New York City



ERICO

The Type SR Bonding Outfit installing Brazed Bonds on the head of rail.



Inexpensive, reliable bonding on the head, web, or base of the rail

Heretofore much of the expense of rail bonding has been due to interruption to traffic during the bonding operation. Not only have car schedules been upset, but much of the time of the bonding crew has been wasted simply waiting for traffic when they should have been applying bonds. The expense involved in delayed schedules and wasted time is, of course, hard to figure, but it can be readily seen that by eliminating this item, the cost of bonding could be greatly reduced and the time involved materially lessened.

The light weight and convenient size of each element of the Type SR Bonding Outfit permits almost instant removal of the equipment. Where headway is short, the equipment can be kept off the track except when moving from joint to joint. The only part that engages the rail during the application of Brazed Bonds is the Welding Furnace, which can be removed from the rail instantly, with one hand. By proper manipulation of the Welding Furnace, bonds can be installed in one and a half to two minutes. A crew of three men, with the Type SR Bonding Outfit, can install as high as twenty bonds per hour.

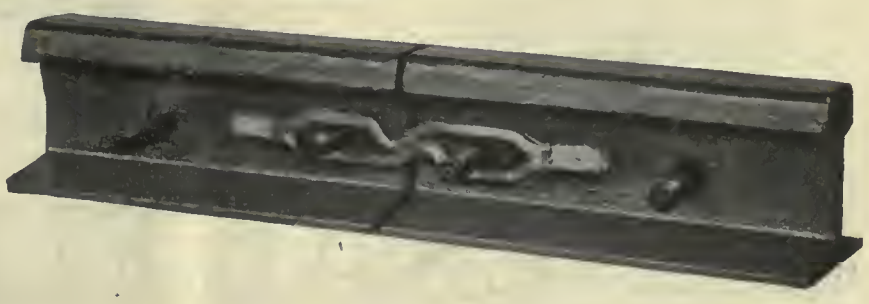
Two interchangeable rail mountings can be furnished for the Welding Furnace. The Standard mounting has adjustments for bonding either the head, or the web of the rail. The Type B Base Mounting inclines the Furnace to install bonds on the top of the base of the rail. The latter method is ideal for cross and special bonding. Where extensive head of rail bonding is required, time will be saved by using an extra Welding Furnace equipped with Type B Mounting for installing cross and special bonds on the rail base.

There's really no good reason why you should pay MORE for bonding LESS sure than Brazed Bonding—is there? We will be glad to send data and prices, without obligation, to whomever you request.

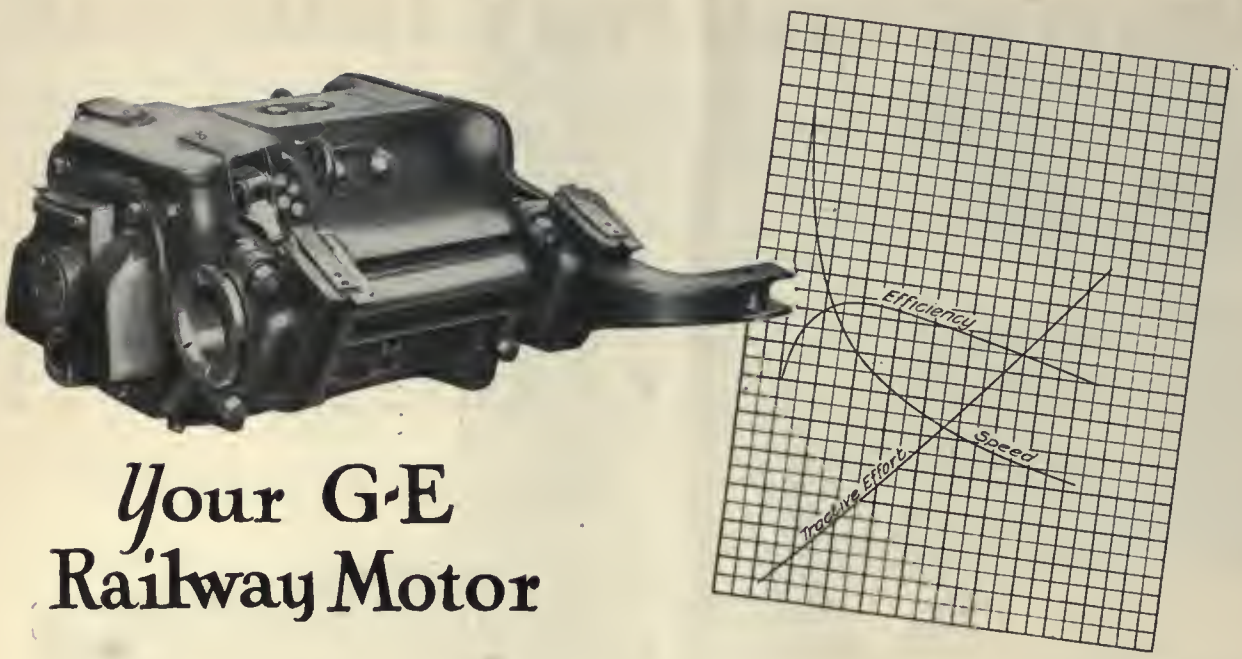
The Electric Railway Improvement Co., 2070 East 61st Place, Cleveland, Ohio.



Type E Brozed Bond for bonding around the joint, or around special work. This bond is also applicable to installation on the top of the rail base.



Concealed Brazed Bonding is simple. Type EC Bonds are made for any bolt spacing, and in balanced or unbalanced conductors to clear almost any fish plate.



Your G-E Railway Motor

Preserve its characteristics

To obtain the best commutation, the brushes for a railway motor should be selected with full knowledge of the motor characteristics.

Only the General Electric Company possesses complete design data pertaining to your G-E Motors. The brushes recommended for them by G-E motor experts will insure the best service —and at lowest cost.

Preserve the characteristics of your G-E Motors and you guarantee continued successful operation. To do this, G-E Brushes, of *original equipment quality*, are essential.

What is true regarding the importance of proper brush selection in preserving the characteristics of your G-E Motors applies with equal emphasis to the purchase of all motor parts. The only safe procedure is to specify G-E Renewal Parts for G-E Motors.



For
Original Equipment Quality

54C-37

GENERAL ELECTRIC

Electric Railway Journal

Consolidation of Street Railway Journal and Electric Railway Review

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CHARLES GORDON, *Editor*

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Readjustment to Permit Financing Through Holding Company

FINANCING to the extent of $65,000,000 done recently by the Associated Electric Company, the largest and most important subsidiary of the Associated Gas & Electric Company, has been attracting attention in the investment field. Included among the properties controlled are several electric railways. The new issue consisted of 5½ per cent convertible debentures sold to yield more than 5.90 per cent. The proceeds are intended to retire various high-rate securities and effect a substantial saving in the aggregate annual interest charges. The refunding constitutes the first step in the simplification of the capital structure of this group of properties. Incidentally the amount of outstanding issues retired under the new financing was $35,846,970, this sum including $5,873,620 of preferred stock. Interest in the operation and its success centers, however, in the purposes behind the issue. Perhaps the most important point is that the makers of the new instrument intend in the future that the operating companies of the Associated group will raise money through the holding company and will not themselves go into the market.

Just how far, if at all, the basic ideas behind the new issues are applicable in the electric railway field is a matter for the financial technician to decide, but it does appear that some of the ideas behind the new issue are in keeping with the suggestions made last year by the advisory committee of the American Electric Railway Association appointed to inquire into the question of financing. The changes suggested by the committee contemplated in some instances a major financial operation. That, of course, was for the extreme case where possible earnings were out of line with the then existing financial structure. These are the rare cases. There are others, however, in which the applications of the principles set forth by the committee can be made a continuing process.

The Pittsburgh Railways furnishes an example of this kind. That company, for instance, came out of receivership with much the same myriad of separate companies that went in, but that company, continuing the plan of eliminating subsidiary corporations where practicable, closed out or merged last year with other subsidiaries sixteen companies. Moreover, the process of retiring bonds is being kept up unremittingly. During 1925 sinking fund retirements totaled $1,210,600, bond retirements $219,000, and total redemptions $1,621,200. Doubtless there are other similar instances, but this one comes to mind in connection with the work of digesting the report of the company for publication in a recent issue of the JOURNAL.

It will not do to dismiss the matter by saying that Pittsburgh is now operating under an agreement that insures to it favorable terms for financing. Many electric railways enjoy an excellent credit rating. They enjoy it because they deserve it. All of them should. But before they do, many of them will have to undergo the drastic financial rearrangement which the committee prescribed for them. The readjustment isn't easy to accomplish. The committee made that plain. Whether or not any of the principles embodied in the Associated Electric financing offer suggestions, such readjustments in finances and in corporate structure as are needed can be carried out. Pittsburgh proves it.

Far-Sighted Transportation Planning Has Made Real Co-ordination Possible

BOSTON is proverbial for the difficulties encountered by strangers in finding their way about. In so far as this condition really exists, it results from the narrow and winding character of the streets in the business district. The local transportation system, on the other hand, has been laid out along lines that are essentially simple and easy to understand. While the actual execution of plans has been hampered by certain physical handicaps and has deviated somewhat from the ideal, results have been attained that are well worth study by any transportation man not already familiar with them.

Subway, elevated, surface car and bus services have been co-ordinated in the city and neighboring towns by the Boston Elevated Railway, as told elsewhere in this issue in an article by Edward Dana, general manager of the system. In a general way, it may be said that east-west and north-south rapid transit lines have been built along the routes of heaviest travel, extending as far as justified by the volume of traffic. Surface car lines radiate from the rapid transit termini into the outlying districts. These surface car lines also serve important intermediate areas where traffic does not warrant rapid transit train operation. By placing the tracks in reserved strips in the centers of the streets and operating three-car multiple-unit trains, service approaching that of the subway and elevated lines is attained on the surface. Downtown the street cars have been placed underground in subways built at great expense, thereby gaining advantages in directness of route and speed of operation that would be impossible on the narrow streets of that district.

During the last few years the bus has been added to the transportation facilities provided by this company. Its development has been rapid. At present the company is operating 190 buses on 25 routes. Bus traffic represents about 7½ per cent of the total carried by the system in the outlying districts. The bus has replaced the street car on some light traffic routes. Crosstown routes have been established connecting the radial rapid transit and surface car lines. More recently, bus service has been extended into the downtown business district to take the place to some extent of the cars which have been placed underground.

The narrow, winding streets which in the first place

hampered surface transportation in the end necessitated the construction of the subways, which to some extent ignore rambling routes and follow directly the lines of travel. The advent of the bus has made it possible to round out the local transportation system by taking care of certain kinds of traffic the volume of which was not large enough to justify rail operation. It would be going too far to say that the present transportation system in Boston is perfection, but it undoubtedly furnishes a noteworthy example of co-ordinated subway, elevated, surface car and bus service.

Competition Has Tangible Advantages for the Individual

COMPETITION for prizes has been looked on for ages as one of the best means of building character. Under the spur of the contest much more thought and effort will be given to the preparation of plans and perfection of methods than when only the dull routine of everyday affairs is considered. As a means to an end, then, a well-organized contest has a very decided value. Nor is it necessary to be the winner in order to get great benefit out of participation. Every contestant is the better for having taken part.

Competition demands extra thought, extra time and often extra expense on the part of the individual. The sacrifice is often looked on merely as a labor of love, with little hope for any reward save the satisfaction of work well done. But sooner or later it is bound to pay in a more material sense. Take the case of the men who have been active in the past Coffin Prize contests. Many of them were little known in the industry before they entered their companies in the lists. Few stood out in contrast to others. Today several of these men have taken a new and commanding position in the field. They have absorbed a new enthusiasm, a new comprehension of their work. In a number of cases this has led to a very tangible reward in promotion by their own organizations to more important positions. Others have obtained increased recognition in their old positions.

These are elements that should be taken into account by any manager who has doubt in his mind as to his ability to make a good showing in the Coffin Prize competition. The decision to enter is fraught with no danger whatever. For the individual who plans the campaign and places his company in the competition there is most certainly a reward in sight—not only the intangible one of personal satisfaction, but recognition from his superiors and from men in the field generally.

The Product Is Judged Rather than the Means

SOME there are who think they have discovered a royal road to riches. That is evidenced by the large number of persons who visit Monte Carlo each year. A similar tendency toward a gambling spirit may be noted in the case of certain transportation men who, having failed as street railway operators, believe that they can turn to the bus and retrieve their losses. Without giving proper thought to the correct locations to place it, or as to its proper use, they plunge ahead with the feeling that the word "bus" by itself will at once be the open sesame to greatly increased traffic and reduced expenses. Nothing could be more fallacious.

Whether the transportation vehicle be run on rails or on rubber, there are certain laws which govern the operation and which must be observed. Transportation is the product delivered. While there may be a small gain in the number of passengers carried at first when buses are installed, due to the novelty and the curiosity of the public, after the newness is worn off the appeal must be that of good transportation, just as it had to be with the street car.

In the long run, just as much transportation sense is needed to get the public to ride buses as should have been used to get them to ride cars. The bus, of course, has an inherent advantage in that an error in routing can be corrected at less expense than when rails have been laid. It is necessary, however, for the operator to discover whether the routing has been decided on correctly and whether the schedules are fitted to the traffic if satisfaction is to be given to the riding public. And, of even greater importance, the public must have the knowledge that its wishes are being given consideration, no matter what vehicle is used.

Safety Zones Present and Future

SHOULD the next census contain an enumeration of developments which have shown great increases during the last few years, it will undoubtedly include safety zones, along with automobile registration, Florida real estate activity and bootlegging.

For many years a very few raised platforms near the foot of Market Street, San Francisco, were practically the sole examples in this country of space reserved in the street for electric railway waiting stations. It is necessary to mention this fact only to disclose the difference between past and present conditions. Now, raised platforms for the safeguarding of persons boarding or alighting from street cars are common from Newark, N. J., to New Orleans, La., and from Jacksonville to the Pacific Coast. Their desirability is generally acknowledged for all situations where the traffic is considerable and the street on which tracks are laid is wide enough to accommodate platforms of this kind. In Detroit some of these platforms even have roofs so that persons waiting for the cars will be sheltered from the weather. There has also been a very great increase of substitutes on the street for these raised platforms, such as areas protected by permanent or movable posts, illuminated hemispherical guards and even painted lines. Indeed, there is hardly a city now so small but that has in its principal street at least one stopping point with some kind of protection for electric railway passengers.

With the merits of the safety zone generally accepted, there are some who believe the public should be guarded even further, and in Detroit it has been suggested that underground passageways be constructed between curb and island platforms to eliminate the dangers of crossing on the surface of the street. Still another plan is a co-ordinated service of buses and trolleys in which the buses would stop every block or two and carry passengers to and from the express stations of the electric railway in the center of the streets.

These proposals indicate a prevailing impression that in busy streets persons passing between car and curb run considerable danger of being injured by vehicles. Indeed, this hazard is usually strongly emphasized by nearly every bus advocate in arguments as to the relative merits of the bus and electric car in city service.

Actually, the danger of such a passage is usually very slight. Pedestrians crossing from one curb to the other run twice the risk because they have twice as far to go, so that if the trip half way across the street to the safety zone is as dangerous as some persons would have us believe, the trip across the entire street should be prohibited.

As a matter of fact, there is no great danger from either kind of crossing, if made at the proper time. Whether a busy intersection is protected by traffic officer or signals, cross traffic must be permitted at intervals, and it is then that pedestrians are able to make the passage. When there are superhighways without grade crossings, as suggested for Detroit by D. L. Turner, there is time to make provision so that pedestrians may cross on a separate level from vehicular traffic. But that time is far distant in most cities.

Cheap Taxicab Era Ends in New York

EXPERIENCE during the last year and a half has taught the taxicab operators in New York City that the 20-cents-a-mile rate does not produce sufficient revenue to afford them a living. When this low rate was first established, few impartial observers thought that it would be a success. An editorial in this paper for Aug. 2, 1924, predicted that it would prove unprofitable. That prediction has now come true. On May 1 the rates of several companies are to be increased to 35 cents for the first mile and 25 cents for each succeeding mile.

Thus ends another dream of doing a street railway transportation job with some other type of vehicle. It was thought in certain quarters that the taxicab rate of 20 cents a mile with no extra charge for additional passengers would take away a considerable volume of traffic from the established transportation agencies. A group of four people, it was said, could travel just as cheaply by taxi as by street car. The unsoundness of this theory from an economic point of view is evident to any one who compares the relative operating costs of the two types of vehicle. No noticeable loss of traffic has been sustained by the electric railways during the low-rate period. Now the taxicab operators themselves have discovered the mistake in their reasoning and raised the fare. The much-maligned street railway is left without a competitor in providing cheap surface transportation.

That Vanishing Automobile Saturation Point

WE WHO are interested in increasing the business of local transportation agencies have long been anticipating the saturation point of sales in the automobile industry. Ten years ago, in common with most of the automobile industry men themselves, it was generally felt that the saturation point was just around the corner. Years went by, but sales continued to increase. Then it was thought that soon there would be one car in every family, and that surely would be the saturation point. Now there seems some basis for thinking that perhaps there is no saturation point. Instead of one car it is getting so there is a whole "gasoline alley" for each family. Father has his limousine. Mother has her Victoria coupé. Brother has his playboy and sister her brougham. Junior has his flivver—and no one stays at home.

While this vanishing saturation point has been flitting just over the horizon, we are now suddenly given the final blow when we read in Henry Ford's new book that ". . . with our present capacity of 2,000,000 a year we are able to meet the needs only of our present owners if they should each buy a new car every six years."

Ponder that!

The miracle of it all is that the total number of riders on the street railways is higher every year—at least the trend is upward. There is also a natural stabilizing force working against the increased use of individual cars. You may keep on multiplying the number of automobiles sold, but the amount of parking space available is practically fixed. As this becomes less and less adequate to take care of the demand and as the streets and highways become increasingly congested, more and more of the automobile owners tend to revert back to common carrier agencies. But to build regular patrons from occasional riders, it certainly does behoove the railways to concentrate on improving service. More is expected of them than was ever the case before the advent of the automobile.

Regulation by Taxation Is Unsound

"COMMON carrier motor vehicles should pay a fair and reasonable tax for the use of the highways, but regulation should not be attempted through taxation." Here, in the words of Ralph Budd, president of the Great Northern Railway, speaking recently in Kansas City before a meeting of the American Society of Civil Engineers, is a principle worthy of most careful consideration.

Such a viewpoint may well be adopted by every transportation executive. Loading the bus down with taxes is not the right form of regulation. The transportation man who advocates heavy taxes for buses is indeed living in a glass house. Transportation as a whole now carries an undue and unfair tax burden. Many electric railway companies pay more in taxes than they earn in net revenue. There is a tendency in the public mind to look with favor on any proposal to increase taxes on a public utility company.

Although there has been much competition between buses and electric railways under most inequitable conditions from the standpoint of taxation, it is a short-sighted expedient to advocate heavier taxes for buses as the remedy of the situation. Such a policy makes more difficult the problem of getting relief for the railways. Regulation should be by other means than taxation.

Relief for the railways should be approached on a different basis. Taxing the bus heavier will not result in lightening the burden of the railway. Experience during the past few years has shown that when a bus competitor is heavily taxed, the taxes come along with his buses when he is absorbed to form a co-ordinated system.

In the sense that transportation is a public benefit, present heavy tax loads on electric railways are definitely a burden on the public. That is the basis on which the local transportation tax situation must be approached and presented to the public. For one transportation agency to favor increased taxes on another because they are temporarily in competition weakens the whole case before the public. Therein lies the wisdom of Mr. Budd's statement.



Exterior of Peter Witt Car Used in Dallas. Thirty More Will Be Purchased in Compliance with the New Ordinance

Dallas to Spend $1,500,000 in Service Extensions

Arbitrary Fixed Fare Theory Broken in New Franchise Amendment that Establishes a 7-Cent Fare—Company Will Spend More than $1,000,000 This Year for New Cars, Track and Paving, and Nearly $500,000 to Retire Temporary Loans for Work Completed or Under Construction

DALLAS, TEX., has broken another fixed fare theory of bygone days. On April 7 the City Commission passed an ordinance establishing a 7-cent fare with five tokens for 30 cents to remain in effect until changed by order of the commission. It is of particular interest to the Dallas Railway that the people of that city and its commission established in this ordinance a rate basis that recognizes a fair return on a fair valuation, without regard to the 5-cent fare which was established in the 1917 franchise, which in turn will open the doors of investment channels so as to allow the company to make the extensions and improvements much needed to provide adequate service in this fast-growing metropolis of the South.

Of immediate value to the city is the agreement of the company to follow out the program of expenditures equaling nearly $1,500,000, outlined by Supervisor of Public Utilities John W. Everman. This budget includes nearly a half million dollars for the repayment of notes and car trust securities covering expenditures for improvements and cars purchased during the last two years by the company in anticipation of the final settlement of this franchise. Some of this money was borrowed from the company's reserves.



Interior View of Dallas Peter Witt Car

More than $1,000,000 remains to be spent in accordance with the program that is given in the table on page 751.

Thirty new Peter Witt cars, similar to those now in operation, will be purchased immediately, and 50 other cars will be rebuilt for one-man operation. This requires the installation of safety devices, including rear door exits equipped with a treadle device. It is planned to expend an additional amount in excess of the franchise budget in the construction of several new cars in the company's



Exterior of Earlier Type of Car, 50 of Which Will Be Changed Over for One-Man Operation. Complete One-Man Safety Features Will Be Used and Automatic Treadle Equipment Will Allow Rear Exit Operation

shops. The plans for these cars are now being developed.

Of particular interest is the construction of 5.43 miles of new track as extensions to six different rail lines into territories that have been served in the immediate past by buses. This is one of the earliest replacements of this kind that has been made in line with the theory generally adopted in recent years that the bus is useful to serve new territory as a forerunner to the railway extension. The buses thus replaced will be used as further extensions or on new routes as conditions warrant.

Something over $400,000 will be used for paving projects on car line streets that will be repaved by the city during the year. Approximately $115,000 will be used to rebuild three railway lines which are a part of Everman Plans one, two and three.

Partly due to extensions and partly to improve the present overhead distribution system $35,000 will be spent for new feeders and equipment. Since the company purchases direct-current power no new substation equipment is contemplated in this budget.

In the event that the estimates for work to be done prove more than necessary the company has agreed to expend any moneys so saved for further extensions and betterments as may be directed by the supervisor of public utilities.

Since the passage of the new fare ordinance the company officials and staff have been busy with the details of the work to be accomplished in the next few months.

For several years the company has operated on a flat 6-cent fare granted for brief periods of a year or eighteen months at a time. These fare grants have

ANALYSIS OF EXPENDITURES AT DALLAS

Equipment:	
Pay balance due on car trust certificates for 30 new cars in March, 1924	$137,484
Purchase of 30 new Peter Witt cars	450,000
Re-equipping 50 double-truck cars with modern appliances for one-man operation	50,000
Total equipment expenditures	$637,484
Power:	
New electric feeders and improvements in distribution system	35,000
Way and Structures:	
Extension of track on six lines. Service heretofore rendered by buses, but traffic thus developed now renders rail extensions advisable	194,000
Rebuilding track on three lines	115,000
New paving required by city	434,814
Total way and structures	$743,814
Contingencies	50,000
Grand total	$1,466,298





Interior Views of a Two-Man Car Changed Over for One-Man Operation. Dallas Plans to Change Over 50 of These Cars

been given in exchange for certain improvements agreed to by the company and have been the basis for the three Everman plans. While this has helped to give the company a much-needed increase in gross revenue, uncertainty of the continuance of the higher fare precluded the possibility of permanent financing. Both the city and the company suffered from this condition.

It is felt by the management that this amendment will make possible the issue of bonds to cover the major portion of these new expenditures, and of preferred stock to cover the balance, on a favorable basis because of the stability thus offered by this new amendment.

It is yet somewhat of a conjecture as to the relative split between full 7-cent fares and 6-cent tokens. The proportion of full fares immediately following the increase averaged about 39 per cent of all revenue fares. It will naturally take several months to determine what the ratio of full fares to token fares will ultimately be. Children and school students are entitled to half rates according to the franchise. The school tickets must be purchased at the company's office on certificate from the proper school authorities stating that the applicant for such reduced rate transportation is a bona fide student of a recognized school. Reduced fare tokens are sold by the conductors or at the company's offices in lots of five for 30 cents.

Abstract of Dallas Railway Ordinance Adopted April 7, 1926

Now, therefore, be it ordained by the board of commissioners of the city of Dallas:

Section 1. That from and after midnight of the day and date this ordinance becomes effective and subject to and in accordance with the terms, provisions and conditions of the aforesaid franchise ordinance of 1917, and upon conditions that the railway company does and performs promptly and with reasonable diligence, those things required to be done by it by the above recited report of the supervisor, and as and when ordered and required by the board of commissioners and supervisor of public utilities of the city, except that instead of agreeing to furnish from time to time $1,000,000 of new money as required by said report of said supervisor, the railway company shall furnish and pay said $1,000,000 into the treasury of the railway company before the acceptance of this ordinance by the railway company, the railway company is hereby authorized to charge and collect rates and fares in accordance with the schedule hereinafter set forth until such time as the board of commissioners, after a hearing had upon its own motion, or upon application of said railway company, shall by ordinance or resolution change said rates, said schedule of fares being as follows:

1. A maximum fare of 7 cents for all persons twelve years of age or over, provided five tickets or tokens shall be given for a cash payment of 30 cents.

2. The fare for children between the ages of five years and twelve years shall be 3 cents to be dropped into the box on the car.

3. Students not above seventeen years of age of institutions of learning as defined in the general laws of the state of Texas relating thereto, shall be carried for the half fare provided for by the state law upon the presentation of tickets to be provided and purchased at the Dallas Railway Company's office by persons exhibiting identification certificates and entitled to such reduced fare.

4. That children of five years of age or less when attended by passengers above said age shall be carried free on the cars of said railway company.

5. That all tickets or tokens issued under the former rate by the railway company and which are unused and in the hands of bona fide owners shall be honored by the said Dallas Railway Company and its conductors and operators until all such tickets or tokens have been used, as a cash fare under the rate herein authorized.

Section 2. That the railway company shall issue tickets or tokens in convenient amounts under the rates herein authorized and place the same on sale in accordance with the directions of the supervisor, and unless otherwise directed by the supervisor, such tickets or tokens shall be required to be kept for sale to each passenger by each conductor on cars having conductors and by the motorman on cars having only motormen.

Section 3. Free universal transfers shall be issued by the Dallas Railway Company in the manner and in accordance with regulations now in force.

Section 4. Out of said $1,000,000 new money so to be placed by the railway company in its treasury before accepting this ordinance as hereinbefore provided, the reserves provided for by said franchise ordinance of 1917, and now depleted as by said supervisor's report set out, shall be replenished. For the purpose of doing the things required of it, the aforesaid report of the supervisor and this ordinance, the railway company shall use that portion of the aforesaid million dollars not necessary to replenish said reserves, the money out of said $1,000,000 used to replenish said reserves and likewise any money in said reserves immediately prior to the acceptance hereof, and that may accumulate in said reserves during the doing of the work required of said railway company by aforesaid report and this ordinance, and not immediately required for other purposes, for which said reserves were created. If aforesaid moneys are not sufficient to do all the things required by said report to be done, then said railway company shall and does by the acceptance of this ordinance, agree to furnish such additional new money as shall be required to complete said things to be done by it as aforesaid. Said additional new money shall be furnished as and when the board of commissioners or supervisor shall direct or require. If the cost of doing the things to be done by the railway company under said report is less than $1,450,000 the railway company by the acceptance hereof obligates itself to expend the difference between such cost and $1,450,000 in making such other and further extensions, betterments, improvements, repairs and replacements not included in aforesaid report, as the board of commissioners or supervisor may direct, and if the said $1,000,000 together with the reserves now on hand and hereafter accumulated to the date when said work is completed, do not amount to as much as $1,450,000, then said railway company by the acceptance hereof, agrees to furnish such amount of new money as with said $1,000,000 and said reserves will make the sum $1,450,000. The amount to be allowed said railway company for property value for the furnishing of the above mentioned new money and doing the things required to be done by aforesaid report, shall be determined by said franchise ordinance of 1917.

Section 5. Nothing herein shall be construed as waiving, modifying, altering, changing, enlarging, diminishing or abrogating as to the city, the railway company, or any other person or corporation, the several terms, provisions, covenants and conditions of said franchise ordinance of 1917, save and except that until otherwise ordered by the board of commissioners as herein provided, the railway company shall be authorized to charge and collect the fares herein specified.

Section 6. The ordinance passed on Jan. 19, 1925, extending the 6-cent fare for a period of eighteen months, and all other ordinance and parts of ordinances in conflict herewith are hereby expressly repealed.

Section 7. This ordinance shall not become effectual unless and until the railway company shall within ten days from date hereof file its written acceptance of the terms and conditions hereof and obligate itself to be bound thereby and shall before the filing of such acceptance place in its treasury the sum of $1,000,000 in new money.

Section 8. The urgent demand for increased street car facilities and the street paving improvements and the great improvement specified in such supervisor's report in order to provide adequate transportation facilities for the people of Dallas, creates an urgency and an emergency in behalf of the public peace, health and safety that requires this ordinance to become effective immediately; and it is, therefore, accordingly hereby ordained that this ordinance shall become effective immediately upon its passage as in the charter in such cases made and provided. Passed April 7, 1926.



Every Automobile Driver on Entering Birmingham on Any of the Principal Highways Must Pass Two Signs Like This

Campaign for More Traffic Brings Results in Birmingham

The Direct Method of Advertising Included the Use of Newspapers, Billboards, Car Signs and Moving Picture Reels—Coincidentally Efforts Were Made to Improve the Service in Many Ways—Trainmen Enlisted as Ride Salesmen

NO DOUBT exists in the minds of the officers of the Birmingham Electric Company of Birmingham, Ala., that the special campaign for traffic which it has been conducting during the past eight months has brought results. Strictly speaking, the campaign has been broader than one for more business only. It has included equally strenuous and effective efforts toward improved public relations, particularly in the direction of acquainting the public with the problems of public utility operation, of making them realize that the purpose of the company and of its officers is to serve them, and bringing the residents of Birmingham into partnership in the enterprise. This latter purpose has included the sale to customers of a certain amount of 7 per cent preferred stock. The company now has more than 3,000 stockholders among the citizens of Birmingham.

But action by the company has not ended with the sale of this stock. Coincidentally there has been a strong effort to improve service in every way possible, to convert automobile users into passengers and to bring home to the public the fact that the Birmingham Electric system is being operated by citizens of Birmingham for citizens of Birmingham.

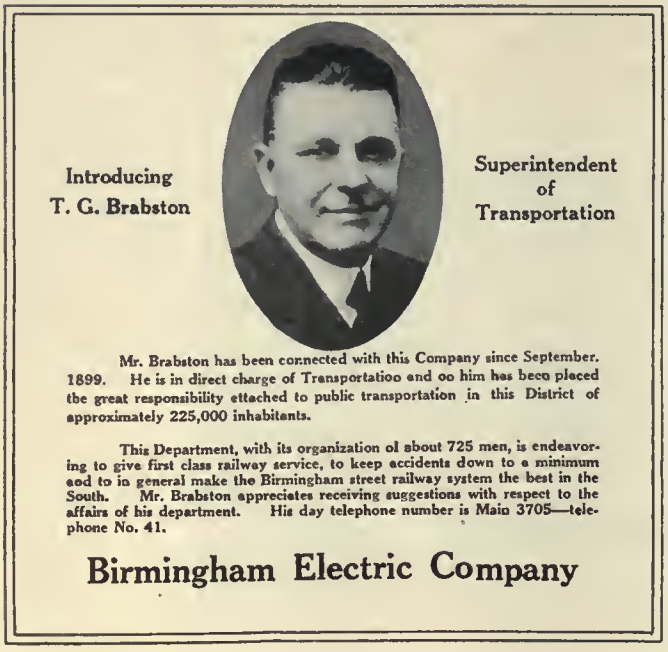
Changing the Auto Driver Into a Rider

The good roads about Birmingham and the practical absence of snow in winter encourage the use of private automobiles to a great extent. One feature in the campaign to change the private automobile user to a car rider when he uses his car in preference to the trolley is a series of large billboards placed at points on the highways entering the city where they will attract the attention of the automobilist. All of these boards carry the slogan "Use the Street Cars," coupled with some other injunction, changed from time to time, like "save the difference," "avoid parking troubles," "they are safe," "they are reliable," "save time, worry and expense," "avoid traffic troubles."

Altogether there are 21 billboards used for this purpose. Two of them are 10 ft. x 50 ft.; the others are 10 ft. x 24 ft. There are nineteen additional painted boards of similar type, using a red background with white letters. The larger billboards are illuminated at night. Every automobilist entering town on any of the principal highways must pass two of these boards.

In its regular advertising space which it carries in the daily papers in Birmingham, as well as in all the weekly papers published in the county, the company has also given considerable space to the private auto user. In these advertisements the trouble in securing parking space has received attention, as two of the advertisements reproduced illustrate.

Dash and window signs are used extensively for the same purpose. With single-end cars the dash signs are carried on the right-hand side of the car in front and rear. The lettering is similar to that used on the billboards. A popular window sign is a series of narrow





A Series of Advertisements Introduced the Railway Officials and Their Work to the Public

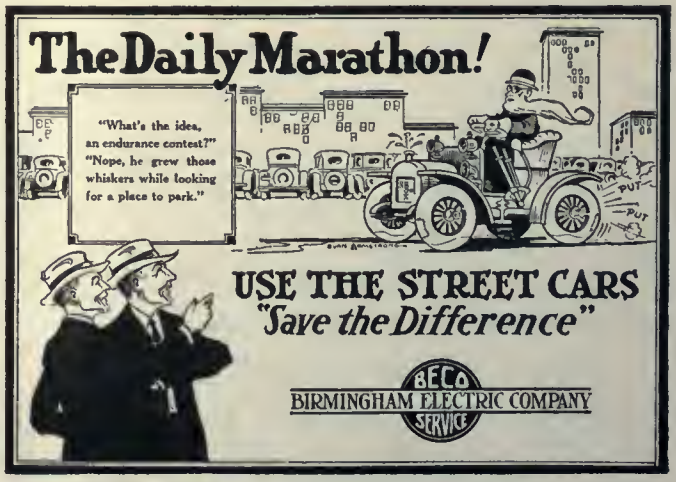
slips pasted on the six upper sashes in the middle of the car, with lettering very much like that on the posters. In the accompanying view of a typical car the dash sign reads, "Use the Street Cars, Avoid Parking Troubles," and the upper window signs read, "Use the Street Cars—Safe, Economical, Dependable." The lettering on the inside of these window signs differs from that on the outside, as the latter is intended for the auto driver, whereas the inside is read only by the car rider. To him the message is, "The operator of this car is chosen for what we believe to be his efficiency," or "The more passengers who ride on this car the better service we can give," or some message of similar tenor. These window signs are changed once a month, while the dash signs are changed once every week.

Besides the newspaper advertising mentioned the company uses theater and other program advertising, has a large advertisement on the drop curtain in the principal theater in the city and has a motion picture slide in colors in all the motion picture houses in Birmingham. It also developed some time ago a split reel devoted to the difficulties of parking an auto in the business streets of the city. All those who took part in the preparation of this reel were members of the transportation department and it represented the difficulties which "Miss Birmingham" had in finding a place to park her car during a shopping trip. Its title was, "Miss Birmingham Goes Shopping." No mention



Beco Bill Is the Traction Tom of Birmingham





Recent Advertisements in the Birmingham Papers Call Attention to the Difficulty of Getting Parking Space

was made in the reel of the company, but the moral was just as evident. The reel was so good that it was shown in fifteen theaters in the city without any charge to the company.

Introducing the Officers

One thought which came to the management was that the methods and policies of a large utility company may often be misunderstood by the public because the company seems impersonal to some extent. In a small town this would not be the case, but in a city the size of Birmingham, with its 300,000 inhabitants, all of the officers and heads of departments cannot know everybody. What is more natural, then, than that they should be introduced. In consequence, a series of advertisements was run introducing each officer and head of department by name and telling something about him. Each concluded with the statement that such officer or head of a department would be glad to have any criticisms or suggestions relating to his department. The company's service includes electric light and gas as well as railway, so that ten or twelve advertisements appeared in this series. Two of them are reproduced.



One of the Four "White Cars" Used in the Preferred Stock Campaign. These Cars May Be Repainted Soon to Carry Some Other Message



Every Car in Birmingham Carries a Dash Sign and Window Sign to Encourage Traffic

Traction Tom Becomes Beco Bill

This method of advertising took care very well of the officers and heads of the department, but obviously was impracticable with the transportation employees, as they number more than 700. Nevertheless, they come in daily contact with the patrons of the road. It was therefore decided to have a personage to represent the large body of men on the property who are not officers or heads of departments. Such a person, it was felt, would seem more real than any mythical individual, but the management did not feel like making any choice which would seem invidious. It was therefore decided to leave the selection to the men themselves.

The plan was explained to the trainmen, who were asked to select some one of their number whom they considered representative of the transportation men—not necessarily an Adonis and not an aged Nestor—but some red-blooded young man who would supply the need. The men acquiesced and Beco Bill became a reality. Beco, it might be said, is a popular contraction in Birmingham for Birmingham Electric Company, and Bill was adopted for euphony.

Beco Bill, who is trainman 1259 and one of the regular employees of the company, figures to a considerable extent in the company's advertising, company publications and other literature. A favorite way of using his name is to introduce some injunction, advice or aphorism with the words "Beco Bill Says." Thus, in the *Buzzer*, the company publication, for Feb. 22 Beco Bill says: "Being courteous toward one's inferiors is one of the marks of a gentleman."

Beco Bill has also served the company in other ways, as by taking charge of the information booth in the company's exhibit at the recent Alabama State Fair.

Among the other means for developing traffic, the company pays a great deal of attention to keeping its cars well painted and clean and insists that its transportation men are neat in appearance when on duty. All cars are washed once a day by a spraying machine. The trainmen are encouraged to keep trim by having in each operating carhouse a free shoe-shining stand and a full length mirror in which they can inspect themselves from head to foot. On the top of this mirror are painted the words, "Do you think you represent Beco service?" The company does not claim it is the only one to use a mirror in this way. It does assert, however, that the mirror is appreciated by the men who take the same pride as a soldier in looking orderly and trim.

In the instruction of new platform men a great deal of emphasis is laid on the need for courtesy and salesmanship, and the same point is made in talking with the

older men. They are the "ride salesmen" of the company. The dispatchers also take care to see that the men when assigned to cars are neat in dress and appearance. Safe operation is encouraged by injunction and also by conspicuous markers at the main carhouse show-



A Full-Length Mirror in the Carhouse Helps the Trainmen to Keep Neat

ing the accidents by divisions. These markers are four large clocks, one for each division, indicating by a black hand the number of accidents on that division to date in the current year and by a red hand the number in the previous year. Every trainman who has gone six months without an accident for which he was responsible or without being reported for dereliction of duty receives a bronze medal. If his record in these matters continues for a year he receives a silver medal, and if for two years a gold medal. A number of men in the employ of the company wear gold medals of this kind.

Only one other means of promoting traffic used in Birmingham will be mentioned. This is the publication of a large map showing the lines of the company. Some ten or more of these maps were framed and set up at principal points in the city, each map being marked in red with the point where the map was displayed. The maps proved so popular that the company has been requested to supply a similar map to each of the 70 public schools of the city.

After all, it is the results which count. The company has had a gratifying increase in its patronage during the last year and attributes at least a part of it to its methods of traffic promotion. During 1925 the company carried about 68,000,000 transfer and revenue passengers. As 2 cents is charged for a transfer there is more reason for including transfer passengers in such a count than on those electric railway lines where transfers are free.

Standard Traffic Signs Used in Winnipeg

By H. G. STEWART
Superintendent Railway Distribution Winnipeg Electric Company

FOR the guidance of patrons and as a visible reminder to motormen to observe bulletined instructions, the Winnipeg Electric Company, Winnipeg, Canada, has adopted a system of signs which are attached to the trolley span wires at various locations. It was the aim in designing these to make them a distinctive shape and as conspicuous as possible without being unsightly. The material used is No. 16 gage sheet iron and in all cases the lettering is black on a white background with a finishing coat of clear varnish. The top of the sign is slotted in two places through which ⅛-in. x ½-in. galvanized strap iron hooks are crimped.

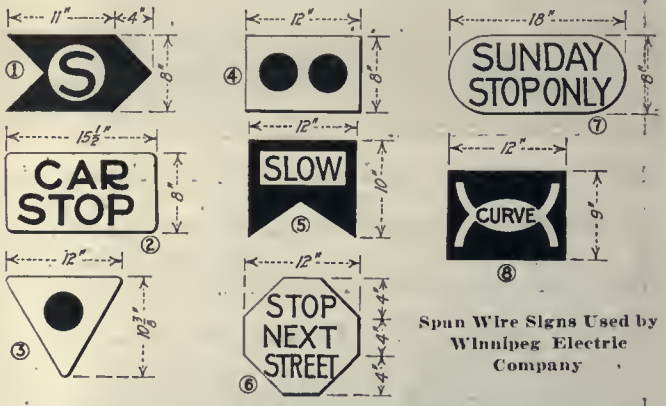
A *"Safety Stop"* is placed at railway crossings other than those which are protected by watchmen or automatic signals and at the foot of intersecting inclines. It warns motormen to come to a stop and then proceed cautiously. In many locations on the Winnipeg system poles are not available for the usual car stop indications as, for instance, where span wires are attached to eyebolts in buildings. At such points a *"Car Stop"* sign indicates to the public and train crews a loading and unloading station.

A *"Car Stop—Next Street"* sign is erected at locations which were formerly regular stopping places that have been discontinued. It is for the information of the public who, through habit, expect to board cars at these places. It is removed when it has served its purpose.

For the convenience of the public this company makes it a practice to have cars stop on Sundays opposite all church doors or at intersecting streets where churches are located and which are not ordinarily a regular stopping place. A *"Sunday Car Stop"* sign advertises this fact to the public.

A *"Circuit Breaker"* sign warns motormen to pass under trolley section insulators with power off. An *"Electric Switch"* sign is a reminder to observe the rules governing the operation of electric track switches.

At the approach to extensive special trackwork, such as leads into carhouse or at the approach to temporary



Span Wire Signs Used by Winnipeg Electric Company

1. Safety stop.
2. Ordinary car stop.
3. Section insulator.
4. Electric switch.
5. Special work sign.
6. Discontinued stop.
7. Church stop.
8. Non-clearance curve warning.

track laid during reconstruction, a *"Drive Slowly"* sign appears. It notifies that cars are to be operated across this special work cautiously and slowly.

On this system practically all intersections and curves were designed for car clearance. In a few instances where clearance could not be obtained *"Non-clearance"* signs warn motormen that cars cannot pass each other.

Buses Supplement Rail Transportation System in Boston

Rapid Development of Auxiliary Bus Service by the Boston Elevated Railway Has Occurred During the Past Two Years—In Part This Service Replaces that Formerly Given by Street Cars, but Considerable New Route Mileage Has Been Added

By Edward Dana
General Manager Boston Elevated Railway



From This Point the Boylston Street Bus Continues on the Surface Through the Downtown District While the Cars Go Underground

CO-ORDINATION of four distinct types of transportation has been accomplished during the past few years by the Boston Elevated Railway. On Feb. 24, 1922, the first bus line was established to supplement the existing street railway, elevated and subway services. Since then this auxiliary service has been developed until 190 buses on 25 lines are now carrying passengers at a rate of 27,000,000 a year. Bus traffic represents approximately 7½ per cent of the total carried by the system.

Bus routes fall into three general classifications. Of the total of 25 routes, five render transportation service in new territory not previously served. Seven have in part replaced former car service, but have also been extended into new territory which the cars did not reach. Twelve have been straight substitution of buses for cars, one is operated only at night in place of owl car service. In general, the fare on buses is 6 cents for a local ride and 10 cents when transfer to other parts of the system is desired. This is the same as the fare on the cars, the 6-cent fare entitling a passenger to a local ride without transfer privilege and the 10-cent fare entitling a passenger to go from practically any point on the system to any other point on the system using buses, street cars and underground or elevated rapid transit lines.

Round-trip route mileage, running time, number of trips daily, type of service and rates of fare for the various bus lines are given in an accompanying table. The total miles of streets covered by bus routes is 49.177. Each day 3,130 trips are operated, making a total of 12,659 bus-miles. At present, the daily mileage operated is about one-fifth of that operated during the entire year of 1922, when bus service was in-

SUMMARY OF BUS OPERATION BY BOSTON ELEVATED RAILWAY

Route	Round Trip, Mileage	Round Trip Running Time	Trips Daily	Total Miles Daily	Type of Service	Local Cents	Fare, Cents, Including Transfer
Wolcott Square—Cleary Square	2.74	16	22½	61.65	Replaced car service	..	10
Wolcott Square—Mattapan Square	6.40	36	82½	528.00	Replaced car service	..	10
Cleary Square—Mattapan Square	3.66	20	6½	23.79	Replaced car service	..	10
Rowes Wharf—Summer and Arch	1.16	10	139	161.80	Replaced car service	5	None
Haymarket Square—Battery and Commercial	1.25	11	77	96.25	Replaced car service	5	10
Belgrade and Center—Center and Eliot	5.23	30	101	527.83	New territory	6	10
Church Street—Center and Eliot	4.67	28	8	37.36	New territory	6	10
Copley Square—South Station	2.90	15	67	194.10	New territory	6	10
Park Street—Granite Bridge	3.52	17	217	763.84	Replacement and extension	6	10
Park Street—Pierce Avenue	2.22	12	45	96.35	Replacement and extension	6	10
Center and Spring—Grove and Washington	2.56	12	54	136.89	Replaced car service	6	10
Andrew Square—Old Colony Avenue	1.33	6	38	50.69	Replaced car service	6	10
North Station—South Station	2.20	18	109½	241.23	Replaced car service	6	10
Union Square (Allston)—Brooks and Faneuil	3.75	18	119	446.13	Replacement and extension	6	10
Green Street—Ashby and Commonwealth	2.63	16	189	496.69	Replaced car service	6	10
Green Street—Granite and Brookline	1.96	10	60	117.54	Replaced car service	6	10
Harvard Square—Kendall Square	4.40	22	130	572.26	Replaced car service	6	10
River and Blackstone—Central Square (Cambridge)	1.39	8	130	180.83	Replaced car service	6	10
Huntington and Longwood—Brookline and Longwood	0.91	6	13	11.82	Replaced car service	No fares collected	
Fenway—North Station	6.05	34	239	1,445.95	Replacement and extension	6	10
Harvard Square—Scolly Square (night bus)	6.87	30	25	171.80	Replaced owl car service	..	10
Union Square, Allston—Union Square, Somerville	6.82	30	132	899.71	New territory	6	10
Main and Massachusetts—Bowdoin Square	4.09	21	195	797.55	Replaced car service	6	10
Medford Square—Fellaway	2.98	16	98	292.24	New territory	6	10
Magoun Square—Sullivan Square	4.21	24	188	791.67	Replaced car service	6	10
Central Street, Somerville—Sullivan Square	3.69	16	40	147.64	Replaced car service	6	10
Faulkner—Cross and Main	2.84	12	137	389.35	New territory	6	10
Medford Square—North Cambridge	5.82	34	136	791.93	Replacement and extension	6	10
Upper Highland Avenue—Broadway North via Malden Square	7.90	36	82	647.47	Replacemeot and extension	6	10
Fellaway and Medford Street—Linden	7.79	40	158	1,231.29	Replacement and extension	6	10
North Street—Arlington Centre	3.35	20	92	308.29	Replacement and extension	6	10
			3,130	12,659.94			

Total number of main bus routes 25
Total miles of streets covered by bus routes 49.177

augurated. The extent of operation in each year is shown in the following table:

BUS MILEAGE OPERATED, BY YEARS

	Miles
1922	63,927
1923	465,382
1924	890,901
1925	2,472,456

In the outskirts of the city most of the bus routes are replacements of former car lines, although in many instances extensions have also been made. Among the routes in this class are those in Hyde Park, Dorchester, West Roxbury, Brighton, Cambridge, Malden and Medford. A route from West Roxbury to Jamaica Plain serves new territory, as does one from Union Square, Allston, to Union Square, Somerville.

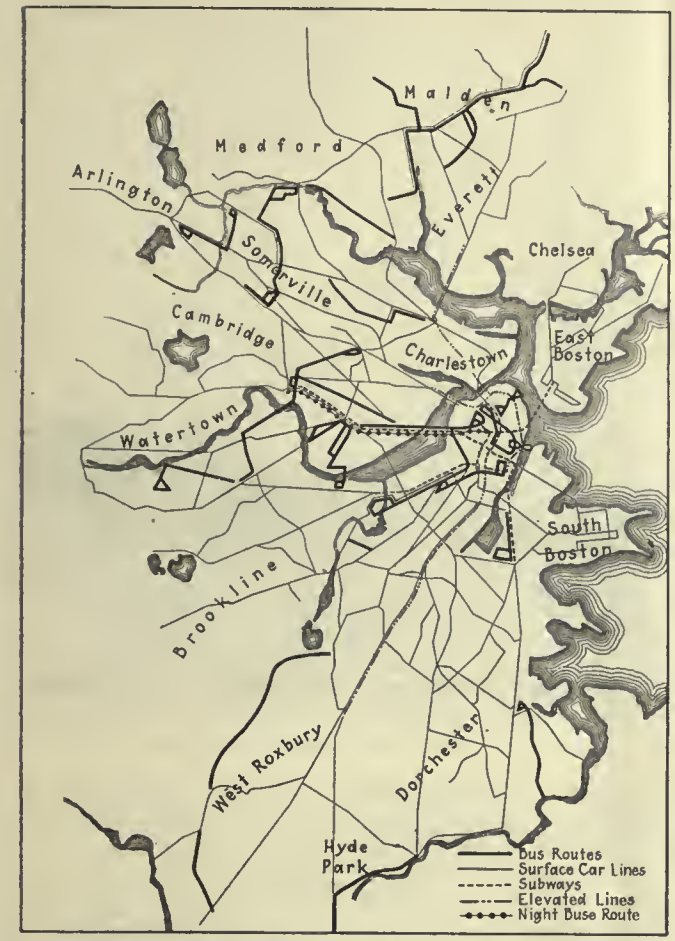
Bus routes are shown on an accompanying map as well as the surface car, elevated and subway lines. Special interest, perhaps, attaches to the bus routes that are operated in the congested downtown business district of the city.

Surface car lines in the congested district have to a large extent been superseded by underground rapid transit lines. North and south rapid transit is now provided by the Washington Street subway, while east and west rapid transit is taken care of by the East Boston Tunnel and the Cambridge Subway. Surface cars are operated over the East Cambridge Viaduct and in subways between North Station and Kenmore Station at the intersection of Commonwealth and Beacon Street and also under Tremont Street as far as Broadway.

For the accommodation of short riders who do not care to go into the subways for a short trip, the company has found it desirable to inaugurate a bus service to a limited extent in the downtown section of the city. In this classification are the Rowes Wharf, the Haymarket-Battery, the Copley Square-South Station, the



A Transfer Point Between Cars and Buses in the Suburbs—Field's Corner, Dorchester



Four Kinds of Transportation Service Are Given by the Boston Elevated Railway Over a Network of Routes Covering the Entire Metropolitan Area

South Station-North Station and the Fenway-North Station routes.

On the route from the Fenway to the North Station, which follows Boylston Street above the subway, crosses along Charles Street between the Common and the Public Gardens and thence to Bowdoin Square and the North Station, an experimental double-deck bus will soon be tried. One such vehicle has been purchased from the Six Wheel Company of Philadelphia. This is the same general type of vehicle as that which is being operated in Cleveland, as told in ELECTRIC RAILWAY JOURNAL, March 24. It is believed that on a route of this kind, passing through the high-class shopping district of the city, double-deck service is likely to prove popular.

Bus equipment operated by the railway is shown in the following table:

BUS EQUIPMENT OF BOSTON ELEVATED RAILWAY

Number	Chassis	Body	Seats
55	White	Brown	25
1	White	Kuhlman	25
25	White	Brown	29
42	Mack	Mack	29
32	Mack	International	25
3	Mack	Boston	25
11	Yellow	Yellow	29
2	Fageol (one de luxe)	Fageol	29
1	Six Wheel double deck	American	61
18	International	Niagara	25
190			

The buses are operated from three stations, Arborway, Bennett Street and Salem Street. Garages have been provided at Arborway, Allston and Salem Street. An additional garage is now contemplated in the vicinity of Union Square, Somerville.

Standardized Overhead for the Canadian National Railways

Recently Electrified Grantham Division of the Niagara, St. Catharines & Toronto Railway Employs System Suitable for Various Voltages and Operation with Either Pantograph or Trolley Collectors

BY W. H. C. VILLIERS
Niagara, St. Catharines & Toronto Railway

DEVELOPMENT of a standard type of overhead construction which is susceptible of adaptation to other lines is an interesting feature of the recently electrified Grantham Division of the Niagara, St. Catharines & Toronto Railway, operation over which was begun some time ago. This line is part of the Canadian National Railways. The Grantham Division extends from Port Dalhousie, the terminus of the Welland Canal on Lake Ontario, to Merritton, the junction with the main line of the Canadian National, and is approximately 6 miles long. Comprised in the system of the Canadian National Railways are a number of electrified divisions, operating at d.c. voltages varying from 600 to 2,400, and also at 3,300 volts a.c. For this reason the standardization of types of construction, so far as possible, is of importance from economic and engineering standpoints.

In the preliminary study of the problems presented by its electrification the engineers in charge of the work, E. B. Walker, electrical engineer Canadian National Electric Railways, and R. L. Harrison, chief engineer Niagara, St. Catharines & Toronto Railway, exhaustively reviewed existing systems, with the object of developing an overhead construction which would combine their advantages to the greatest degree and at the same time be suitable for any of the voltages mentioned and meet the exigencies of trolley wheel or pantograph operation. The design of overhead construction finally evolved is the result of an analysis of the advantages



Armless Tower on 3-Deg. Curve

and disadvantages of the three principal types of construction, viz: (a) Wood poles with normal spacing; (b) light steel poles of various types with normal spacing; (c) heavy steel poles and steel bridge structures with long spacing. The design not only utilizes the good features of these systems, by combining the permanence of steel construction with the capital economy of wood poles, but it does so at an increase in cost over the latter of not more than 10 per cent.



Overhead Structure at Welland Canal Swing Bridge



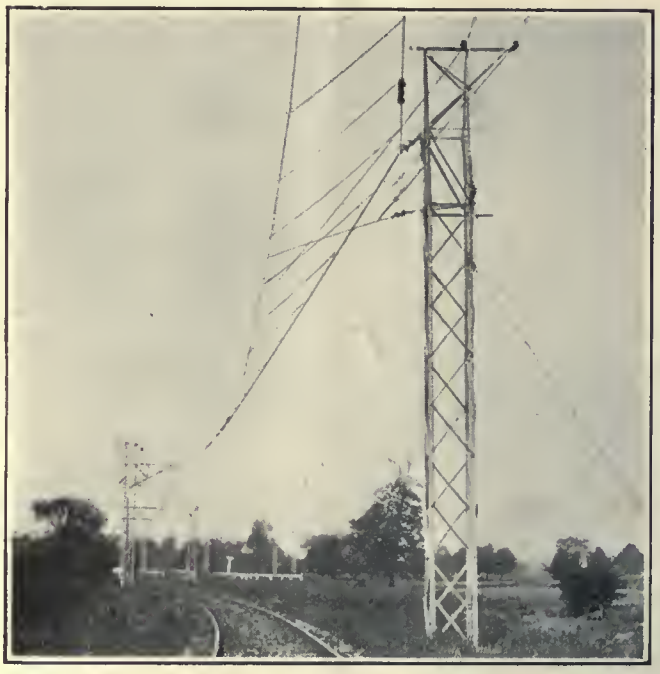
Standard Tangent and Armless Towers on Curve

The standard tower evolved is built up of hot-galvanized standard angles forming a square column. Its height is approximately 25 ft. Various standard "heads" to suit the physical conditions of the track may be attached to the tower. A standard tower for tangent, towers with high-tension and telephone extension and armless towers used on curves are shown in accompanying illustrations. Provision is made for carrying high-tension and telephone-dispatching circuits.

Liberal loading allowances were made in calculating the towers and actual tests have shown a safety ratio of two to one. The towers were fabricated by the Canadian Bridge Company of Walkerville, Canada, and all are set in concrete, the work of erection being done by the Niagara, St. Catharines & Toronto Railway, under the direction of J. W. Walker, electrical supervisor.

To compensate for the increased cost of steel structures, it was considered possible, by carefully limiting the weight of the overhead system, to adopt a normal span of 330 ft. on tangents, with a maximum sag at normal temperatures of 6 ft. and a corresponding messenger tension of 3,600 lb. The operating voltage on the new division, uniformly with the remainder of the Niagara, St. Catharines & Toronto system, is 600 volts direct-current, and the trolley, which is standard No. 0000 grooved-section, hard-drawn copper, is suspended by means of special hangers from a specially made messenger consisting of a seven-strand steel core surrounded by two layers or 30 strands of aluminum, each strand being of 0.1261-in. diameter. This messenger wire, which weighs only 3,944 lb. per mile, provides a conductivity equivalent to 300,000 circ.mil of copper and has an elastic limit of 16,600 lb. per square inch and an ultimate strength of 22,000 lb. per square inch. While the span adopted is greater than usual, the low weight of the overhead system reduces the actual loadings to less than exists in many systems with less than 300 ft. spacing, and yet provides, with calculated maximum ice and wind loadings, a high factor of safety.

Considerable ingenuity was displayed by the engineers in adapting the existing swing bridge over the Welland Canal to electric operation. Special steel structures, built up from standard tower sections, were designed for this purpose; also special steel anchorages, of similar character, for the messenger, at each end of the bridge. Ohio Brass Company insulators and fittings are used.



Armless Tower with Vertical Extension

Construction adopted on this division has proved so satisfactory, from considerations of cost, strength and appearance, that it has recently been installed on a 2-mile section of the Toronto suburban district of the Canadian National Electric Railways and also on a 10-mile extension of the electrification of the Montreal Tunnel, operated at 2,400 volts with multiple-unit cars.

Citizen vs. Street Railway

The Public Is Not a Mass but an Individual Raised to the *N*th Power, and Public Opinion Is Therefore Only a Greatly Enlarged Private Opinion—It Is Not Enough to Do Our Best, but the Public Must Be Told Our Story

By Ed Wolff
Hughes, Wolff & Company, Inc.

THIS case is now being argued in the Supreme court of public opinion. The attorney for the people is the motor car. In a desperately short time there promises to be handed down a verdict. It will be final. The street railway will be reinstated and rehabilitated or it will languish slowly into oblivion. What is the case for the prosecution?

It will be well first to draw a picture of the complainant. He is not "the public." There is no such thing as a composite public, which can be considered as an individual. For a quarter of a century my experience as an advertising man has brought me into contact with scores of public service corporations and big manufacturers and has taught me this one important fact—that the companies which succeed best in winning and holding friends among possible customers are those which have discovered that "the public" is not an entity, a homogeneous mass, but is a great group of individual men and women. The public is one man, or one woman, multipled to the *n*th power. As soon as the heads of a mighty business learn that the consumer is just one person, duplicated over and over, things take a turn for the better. Our complainant, then, is Pete Harris, of Any Street, Everywhere. As parties to the suit he has behind him several millions of other men and women, but, essentially, our antagonist is Pete Harris. Win him over and we have won over all of his kind and breed. Let us see what has happened to Pete Harris recently on the street car.

In Milwaukee, last February, Pete Harris's mother was on a Downer Avenue car. I happened to be there myself. She is not an attractive woman any more. Her age is all of 65. Her face is lined and wrinkled, the skin is sallow, the eyes dull. Her clothes are old and faded. Stupid, unseeing and slow, she is, frankly, enough to irritate the average man who might transact business with her. So when the car had started again and she said to the conductor, from half way down the aisle, "I wanted to get off here," he could not be expected to stop the car midway of the block. And when he retorted, "Well, lady, why didn't you ring the bell?



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Rube Goldberg's Idea of Street Car Etiquette as Displayed in a Collier Car Card

I'm a conductor, not a mind reader," one may hardly blame him too harshly.

But when that old lady tells her son Pete about it that night and pictures how her dignity and pride were humbled by the conductor in front of 20 or 30 people, Pete becomes hotly indignant. With all her shortcomings, that woman is Pete's mother. She was in no position to engage in a verbal battle with the conductor before a strange audience. Maybe her breeding as a lady would not have permitted it. Be that as it may, the assailant of Pete's mother wore the uniform of the traction company, and so far as Pete is concerned it is the company which has insulted his aged parent. Does Pete explain to her that the company tells its men to be courteous, that it has no intention of allowing its employees to offend its patrons? Pete does not. Pete doesn't even know whether this is true.

What he does know is that a duly authorized agent of the corporation has made his mother cry in bitter grief. And Pete is mad about it.

Meanwhile some dozen or so other men, who also have mothers, or wives, or sweethearts, make mental note of the occurrence which developed before their eyes. In imagination they see their dear ones undergoing the same indignity. Immediately, without an effort on his part, Pete has these men ranked solidly behind him in his suit—Citizen vs. Street Railway. They are witnesses for the prosecution as well as co-prosecutors.

Later I met another member of Pete's family on a Market Street car in Chattanooga. It was his wife. She is a buxom, fairly good-looking woman; not overly-refined or educated, but a typical American woman of the middle class. When she paid her fare I heard her ask the conductor to put her off where she could catch a Signal Mountain car. By the time we neared Lookout Mountain, and were a mile or two from her connecting point, she reminded him of it. He said: "Lady, you passed it long ago.."

"But I told you to put me off there."

"I called it out. Why didn't you listen?"

"Why didn't you call me? I sat right near you purposely. I'm a stranger here. Give me a transfer back."

"I can't do that."

"Well, I'll stay in the car and you can carry me back."

"All right. But you'll have to pay your fare again."

"I guess not. Why should I?"

"Lady, this car has to go ahead. Are you going to stay on or get off?"

Pete's wife got off. Some silly school girls across the aisle had the poor sense to giggle about it. She heard. Her face flushed. No doubt she told Pete about it when she got back home. Did Pete tell her that it was her fault? Did he explain that conductors are bound by rules that they cannot overstep? He did not. Remember, this is Pete's wife. He loves her above all women of the earth, except perhaps his mother in Milwaukee. What does he do? Being human, he chalks down another score against the traction company.

And again some dozen or so men line themselves up with Pete. The number of parties to the prosecution grows.

Pete ruminates over these things and they burn inside of him. Then he gets off from work that night tired and hungry. It is raining—a leisurely, sloppy rain. His clothes are wet, his shoes are wet, his temper is wet. He waits, and he waits. The longer he waits the madder he grows. The knot of people who are waiting with him grows and grows. Somebody makes a clever remark about the service. Some laugh. Some, like Pete, grit their teeth and swear under their breath. Finally the car looms into sight.

It is packed tight. Human ingenuity could not get another person into that car, even if human endurance could tolerate the pressure. The motorman, already behind schedule and knowing the condition of the interior, has no time to stop and explain; still less to lose more precious seconds by stopping at all. He sails majestically by the waiting group. Three voices are lifted in imprecation—one sarcastically, one profanely. One says: "We ought to have buses on this line." The suggestion goes unanswered, but everybody thinks.

Another car is right behind. "Fine service," growls a man. A confused murmum of agreement comes from the group. They push into the car, already uncomfortably full due to the unexpected rain. The conductor yells, as I heard him yell in Rochester last week: "Step back there! Plenty of room in the back. What do you want to act like cattle for and crowd up in the front? Step back, I tell you. Step back!"

Pete steps back, but his fists are clenched and his lips are white. There is no more room in back than there was in front. But moving back did leave a little more space in front to jam a few more people into at the next stop. Pete notes this, but says nothing.

Leaving Pete for a moment to fume and stew by himself, let me remark that I have been publicity counsel and advertising agent for more than one public service corporation, including street railways. Neither for myself nor for readers of ELECTRIC RAILWAY JOURNAL do I need to repeat the points in the case for the defendant. I know, as you know, the instructions given to the car crew. I know what happens to schedules and the thousand and one things that "the public" is and does. But what you know and I know does not count. What we're standing trial for today is what Pete Harris knows, or thinks he knows.

Pete Harris is complainant and tells his story as he sees it. And behind Pete Harris stand several hundred thousand, or million, other Pete Harrises, ready to testify in his behalf before the jury. And the jury is composed of twelve Pete Harrises? Or twelve million. Where's our case?

Witnesses for the defendant having testified, the most able and representative is cross-questioned:

Q. What do you think is needed to revive traction patronage?

A. Better-looking cars—more architectural and artistic.

Q. Millions of people are riding in rusty and dirty motor cars, aren't they? Cars without art or beauty?

A. Yes.

Q. Those people, lots of them, live in decidedly inartistic homes, don't they?

A. Yes.

Q. Argument invalid. Any other thing?

A. Yes. Street railway cars should make less noise.

Q. Well, why don't they?

A. The car builders don't make them.

Q. If you refused to buy noisy cars, as the public refuses to ride in them, the car builders would make them, wouldn't they?

A. Have to, I suppose.

Q. Do you employ engineers?

A. Do we—say, what do you think we're running? A fruit stand? Of course we em———

Q. Don't they know that noise means friction, and wear, and expense?

A. Yes.

Q. Well, then, why don't they show you what noisy cars mean to you in loss and expense, even regardless of the public?

A. I refuse to answer such a silly question.

Q. Never mind. The public and the motor car makers are answering it for you. What steps does your company take to make friends with the public.

A. Make friends with the public? Why, I never heard of such a thing. Doesn't the public need us?

Q. That's a question nowadays. Tell me, do you advertise?

A. Advertise! For what? Haven't we got the business now?

Q. You used to have. Have you got the public's good will?

A. Well, no.

Q. Isn't that what's wrong with your business?

A. Perhaps.

Q. If the public understood all your problems wouldn't it be more reasonable?

A. No.

Q. Why not?

A. Well, people are ignorant.

Q. Of course. But if you explained your side of the case through the columns of the daily press, as other business men do, wouldn't the public come out of its ignorance? Wouldn't it know what it doesn't know now? And who is going to teach it those facts if your company doesn't? You're excused.

The fact is that the experiment has been tried. Some eleven years ago in San Antonio, Tex., I arranged with Vice-President Tuttle and his co-worker, E. E. Eysenstein, to put on a newspaper campaign for the traction company. We took the public into our confidence. We told how much it was costing to lay new tracks; the percentage of fares received that went into new equipment, operating expenses, damage suits, and so on. We were frank, open and honest. We appealed, in a dignified way, for public support on the basis of honest intent to render worthy public service. It would require too much space to detail the various benefits that were apparent in even so short a time as one year, but the most noteworthy was a reduction of about one-third, as I recall it now, in the amounts of the damage suits filed against the company.

Now, what are we going to do with Pete Harris? Are we going to let him curse and rave and swear at us in the future as he has done in the past, until the motor car makers calmly take over our business with Pete's consent, or are we going to find out just what ails Pete, try our level best to give him what he reasonably wants and is entitled to?

Are we going to let Pete sit in sullen silence, while we sit in sullen silence, blaming each other in ignorance of our reciprocal need? Are we going to make an active effort to save Pete as a friend and patron or are we going to continue to tell him to "go to ———," Detroit, where motor cars are made?

Traffic Increased by Use of New Cars

Modernization of Rolling Stock of the Morris County Traction Company Has Attracted Additional Riding and Reduced Operating Expenses — Taxes and Paving Charges Amounting to 18 per Cent of Gross Receipts Endanger Continuance of Railway Service



Through Service Between Morristown and Newark Has Been Established by the Morris County Traction Company
A Morris County car is here seen emerging at the western end of the Public Service Railway subway. Public Service terminal is seen in the background

IMPROVEMENT in the local transportation service in Morris County, New Jersey, has resulted during the past several years from the modernization of the rolling stock of the Morris County Traction Company. This has brought about a gratifying increase in the number of passengers carried by the railway and a reduction in operating expense to 25.23 cents per car-mile. An unfortunate combination of taxes and paving obligations, however, places such a heavy burden on the company that its operation is unprofitable.

In April, 1920, fifteen single-truck Birney safety cars were first placed in regular operation. Prior to that time, the railway had a number of old wooden cars which have now been largely retired from service, and also some comparatively modern double-truck two-man cars with steel bodies. Disadvantages of the latter type of car were their weight and the need of a two-man crew. Modifications in the design were made at a later date, so that by April 15, 1923, it was possible to inaugurate complete one-man operation of all cars. In September, 1924, ten light-weight double-truck safety cars were bought from the Osgood-Bradley Car Company and placed in service.

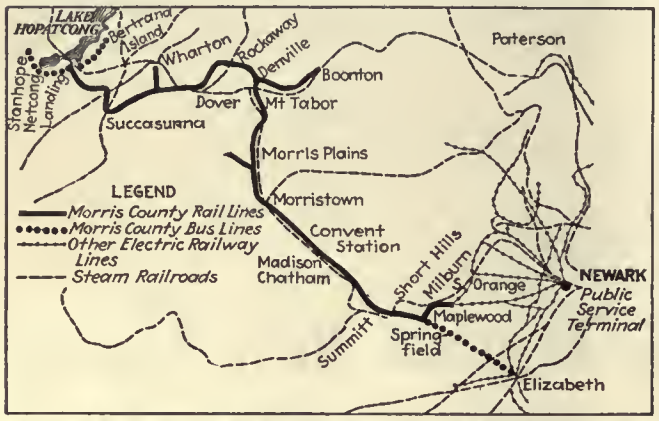
Among the savings resulting from the operation of more modern equipment has been a substantial reduction in energy consumption. Comparative figures for various types of cars are given in the table below. The average speed is 11.42 m.p.h.

ENERGY CONSUMPTION PER CAR-MILE

Six old-type double-truck cars	3.0 kw.-hr.
Thirteen double-truck steel cars	2.6 kw.-hr.
Fifteen single-truck Birney cars	0.9 kw.-hr.
Ten light-weight double-truck cars	1.7 kw.-hr.

Other expenses of operation have been similarly reduced, so that the present cost per car-mile is 25.23 cents as against 28.77 cents in 1922. Distribution of these costs among the various operating accounts is given in the table on page 764.

The total number of passengers carried increased in 1924 over the preceding year and again in 1925 over 1924, the total for last year being 7,891,942, which is the largest in the history of the company. An interesting and gratifying change has occurred in the riding habit, so that the traffic is now considerably more uniform throughout the year than was formerly the case. This is shown graphically in an accompanying



Car Lines of the Morris County Traction Company Connect All the Principal Towns in Morris County and Connect with Public Service Railway Lines in Elizabeth and Newark

chart, giving a comparison of passengers carried by months from 1922 to 1925 inclusive.

Several factors are believed by the management to have contributed to the increase in traffic. The comfortable riding qualities and attractive appearance of the new cars undoubtedly have had an important effect. Through operation between Morristown and the Public Service Railway Terminal, Newark, a second factor of importance in building up traffic commenced on Dec. 6, 1925, as told in ELECTRIC RAILWAY JOURNAL for Dec. 12. This eliminated the necessity of changing cars at Maplewood, where the tracks of the two companies join. Growth of the residential communities in Morris County is another element which has aided traffic.

Through operation between Morristown and Newark involved several problems of fare collection. Morris County cars are operated by their own trainmen over the tracks of the Public Service Railway. It was stipulated in the agreement, however, that this service should be available to local passengers between Maplewood and Newark on the same basis as that given by Public Service cars. Fare collection on the Morris County cars is on the pay-leave plan in both directions. Each passenger, except those boarding in the initial zone, receives an identification check. These are different for the different zones and enable the operator to determine how much fare should be paid when the passenger leaves the car. The area of operation over Public Service tracks is treated as two additional zones of the Morris County line, but the fare charged is that of the first-named company.

Morris County fares are 7 cents per zone, having been increased in May, 1918, from the previous rate of 6 cents. That rate, in turn, had been increased in November, 1917, from the original 5-cent fare. The average length of fare zone on the main line is 3.94 miles, while the average length for the entire system, including branches, is 3.72 miles.

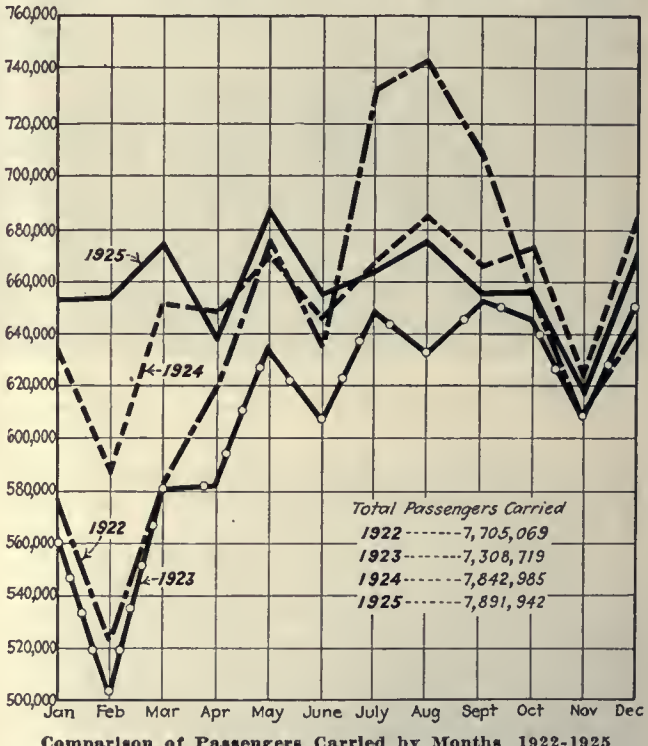
Bus operation has been undertaken by the railway on three lines. Beginning in May, 1925, service was commenced on a line 3 miles in length from the railway terminal at Landing to Netcong and Stanhope, and on

COSTS OF OPERATION, MORRIS COUNTY TRACTION COMPANY, 1922-1925

	Cents per Car-Mile			
	1922	1923	1924	1925
Maintenance of way and structures	5.46	5.00	4.54	4.50
Maintenance of equipment	2.80	2.28	2.80	2.80
Power	6.47	6.01	5.10	5.19
Conducting transportation	8.87	8.94	8.38	8.01
Traffic	0.02	0.10	0.08	0.05
General and miscellaneous	5.15	4.81	4.77	4.68
	28.77	27.65	25.76	25.23

a second line 1 mile in length from the same terminal to Bertrand Island. The fare from Landing to Stanhope is 20 cents and the fare from Landing to Bertrand Island is 10 cents. Prior to 1916 the Morris County Traction Company operated from May 30 to Sept. 4 each year from Landing to Bertrand Island over the tracks of the Lackawanna Railroad for a distance of 3,800 ft. This operation was discontinued during the war, due to heavy freight traffic serving a munitions plant on this line of the steam railroad, and was not resumed thereafter. The bus route to Netcong and Stanhope is new. Substitution of buses in place of cars on the branch from Springfield to Elizabeth was made recently to avoid expensive track repairs.

Despite the favorable results which have accrued to the railway from the modernization of equipment, the present financial situation is serious due to extremely heavy tax and paving burdens. In 1925 the franchise and gross receipts taxes paid by the company amounted to 8.728 per cent of its total gross revenue. In addition, taxes locally assessed on rights-of-way, real estate and buildings made the total in excess of 9 per cent of the gross receipts. Paving obligations have amounted to approximately 9 per cent of the gross, making the total



Comparison of Passengers Carried by Months, 1922-1925

obligations of this character more than 18 per cent of the revenue.

Of the total mileage of the company, 15.43 is on private right-of-way, 10.65 alongside of paved streets and 22.56 in paved streets. Snow removal on the paved streets is done by the railway. Counties, towns and the state are supposed to remove the snow from the sides of the streets, but in actual practice

it is often found that only the space cleared by the railway is available for traffic. Concentration of all traffic on the pavement in this small area wears it out rapidly.

Acting on the complaint of numerous automobile drivers, the State Highway Commission recently applied to the Attorney-General of New Jersey for forfeiture of charter of the Morris County Traction Company on account of failure to perform its paving obligations. An unusual legal situation is thus presented because the company is at present in the hands of receivers, appointed by a United States court.

Paving Obligations Prove Heavy Burden

The receivership dates from July 23, 1923, and was the outcome of refusal of a minority interest to agree to a refinancing plan. In 1918, the earnings being insufficient to meet the full interest charges on the bonds, the bondholders agreed for a period of five years to exchange the 5 per cent coupons on their bonds for new coupons at 2 per cent and an income trust certificate to cover the difference. Under the trust agreement the 3 per cent coupons attached to the income trust certificates were automatically canceled each year if the earnings were insufficient to permit payment. During the following five years the 2 per cent coupons were regularly met and the income trust certificate coupons were canceled. Before the expiration of this agreement in 1923 a refinancing plan was submitted to the bondholders. According to this plan they were to accept new bonds at 6 per cent for half of their holdings and non-cumulative preferred stock for the other half. Execution of this plan required the consent of all the bondholders. Unfortunately, three individuals out of a total of 286, representing only 3.13 per cent of the bonds, refused to deposit their holdings for exchange and the refinancing plan could not be undertaken.

When the original paving agreements were made, macadam paving was in general use throughout the territory in which this company operates, and it was stipulated that the paving work done by this railway should be of this type. In recent years, however, heavier pavements have come into use and an attempt has been made to have the railway install these more expensive kinds. To this the company has objected. As a solution of this difficult problem a bill was introduced in the New Jersey Legislature to relieve street railways in part of their paving obligations. Although passed by the Senate and General Assembly, this bill was vetoed by the Governor and the question reverts to its original status.

Substitution of buses for cars has been considered as a possible remedy for the situation. While this might be advantageous on certain branch lines, it is not thought by the management to be a sound economic arrangement for the main line. Operating expenses, on account of the modernization of equipment, are well within the revenue, and the financial difficulties are entirely the result of the heavy taxation and paving obligations. While it might be possible to eliminate some of the latter by substituting buses for cars, this would simply shift the paving burden to the municipality. It is believed to be a better plan to make such a shift by legal means and to continue the operation of cars, which, it is stated by the management, can provide the necessary transportation service more economically than it would be possible to do it with buses.

Hose Bridges Adopted in Pittsburgh

TESTS were recently conducted by the Pittsburgh Railways in collaboration with Chief Richard Smith of the city fire department and Ben Marshall, city traffic engineer, to determine the desirability of using hose bridges to prevent tie-ups of street car traffic by fires. An accompanying illustration shows the



Simulating Actual Emergency Conditions During Tests of Hose Bridges in Pittsburgh

carrying out of these tests under circumstances as nearly as possible approaching actual emergency conditions. The results were so satisfactory that hose bridges have been made part of the regular equipment of emergency trucks of the railway. The type used in Pittsburgh were supplied by the Ohio Brass Company.

Bus Discussion in the "National Municipal Review"

RELATIONS between the bus and other forms of transportation was the subject of an article by Walter Jackson, consultant, Mount Vernon, N. Y., appearing in the *National Municipal Review* for April. Economic aspects of bus service as a substitute for electric railway service were discussed. The value of co-ordination was brought out, but it was stated that mere "alternation" of cars and buses should not be confused with "co-ordination." Possibilities of de luxe service and the present interstate bus situation also were touched upon.

Co-operation Between Hotel System and Electric Railway

AN EXAMPLE of co-operation between hotel management and electric railway services is noted in the time-table schedule of electric railway services in and out of Fort Wayne as shown in the booklet of the Keenan Hotel System. An interesting sixteen-page pamphlet has been issued as an invitation to salesmen to talk over their problems at the Anthony Hotel or the Keenan Hotel in Fort Wayne, and if they must travel it directs them to new territories. For this purpose two traction time cards are provided which cover all traction lines in and out of Fort Wayne. Steam schedules can be obtained in the lobby of the hotel. These schedules, together with the map in the center of the booklet, should furnish the traveler a fund of information from which to work out the most advantageous schedule for his particular destinations.

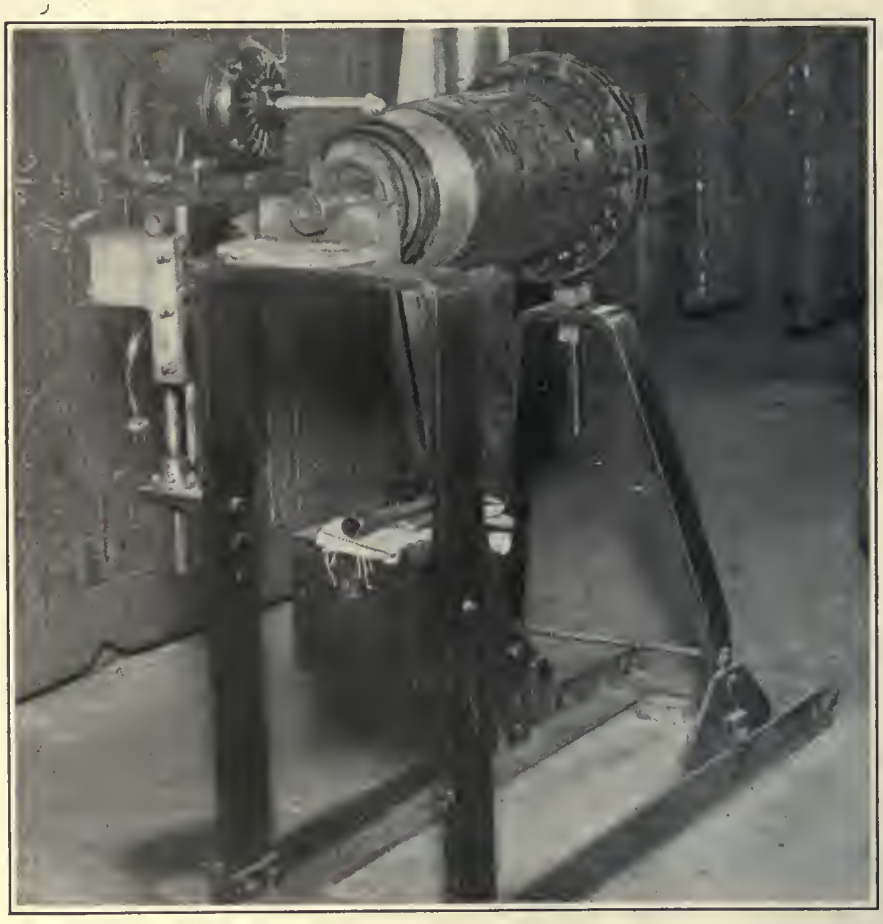
Maintenance Notes

Convenient Commutator Slotter

IN THE Atlanta shops of the Georgia Railway & Power Company is a home-made commutator slotter which has proved very convenient and useful. It is shown in the accompanying illustration. Power for the slotting saw is provided by a ¼-hp., 110-volt, single-phase motor, which has an armature speed of 1,120 r.p.m. The saw is carried on an extended arbor.

The motor is raised or lowered by means of the vertical screw shown attached to the left upright of the frame. The sliding carriage for raising and lowering the motor is provided with adjusting screws to take up lateral wear, both guides being renewable. The horizontal feed of the motor is obtained through moving the carriage the length of its cut by means of the lever shown at the left. The motor is also mounted on a pivot, making it possible to slot commutators which are slightly skewed.

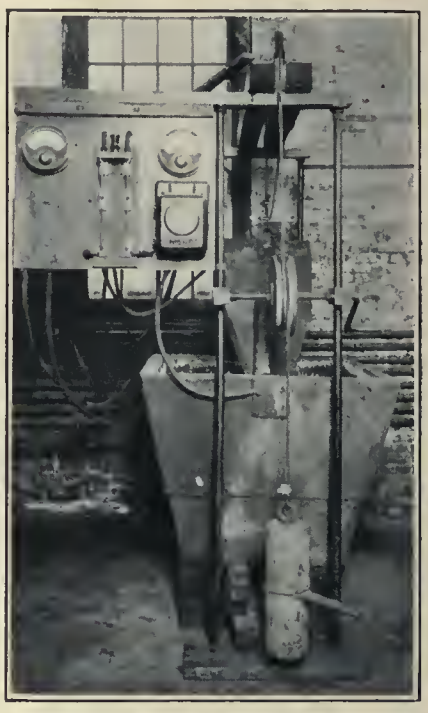
The block supporting the commutator end of the armature shaft is always at the same height, but the upright which holds the pinion end of the armature shaft is adjustable to care for various heights and lengths of armature.



This Commutator Slotter Is Rapid and Adjustable to All Sizes of Armatures

Water Rheostat Test for Gas-Electric Buses

FINER load adjustment is possible with the water rheostat test now being used by the Philadelphia Rural Transit Company to determine the power plant efficiency of gas-electric buses than may be attained with the grid type of rheostat commonly used in dynamometer testing equipment. Each garage and the mechanical and electrical laboratories of the company are now being equipped with these rheostats, which consist of the following units:



A Cast-Iron Receptacle with Salt or Soda Solution Is Used for Rheostat

A cast-iron receptacle holding about 55 gal. of salt or soda solution, a balanced electrode weighing about 25 to 30 lb., necessary pulleys and rope for same, a wood instrument board having mounted thereon a 600-watt G.E. ammeter, one 600-volt G.E. voltmeter, one watt-hour meter, one 250-amp., double-pole knife switch, necessary terminals, meter wiring and 75 ft. of No. 00 heavy insulated lead wires.

Referring to the accompanying wiring diagram, the procedure of testing is as follows: The terminals marked *A* are connected to a junction block provided for this purpose on the left-hand side of the chassis, the engine is then started and a load of 200 to 400 amp. is transmitted to the generator through the manual operation of the electrode *B* coming in contact with the salt or soda solution in the cast-iron receptacle *C*. The area of contact between the electrode and the liquid entirely controls the resistance applied to the generator.

On each test the engine r.p.m. is at its maximum and during such time the radiator water tempera-

tures are recorded. The thermal efficiency of the sleeve valve engine, the type of which is being used in conjunction with the G.E. 25-kw. type generator, is about 85 deg. C.

The following is a sample of test made on two buses. The first bus, No. 278, was found to be efficient and the second, No. 512, inefficient. Each of these tests, as listed in the table below, was made before inspection.

From the above data it will be seen that there is a vast difference in the output of these two vehicles, and therefore, in order to preserve the life of the power unit so that the gas and oil consumption may be

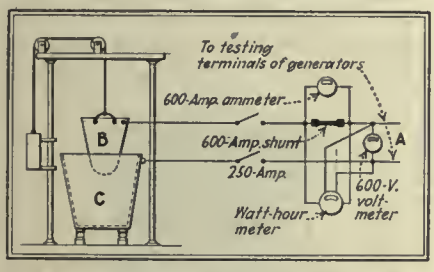


Diagram of Connections Between Switchboard and Liquid Rheostat

brought down to its lowest figure, buses similar to No. 512 must be checked and remedied. The advantage of a water rheostat test is that only power plants showing marked inefficiencies need be torn down for repair.

A copy of the foregoing test is handed to the garage foreman before an inspection of the vehicle is started, and when a bus has the same performance as No. 512 the foreman will make a personal inspection of the power plant of this bus in order to determine the method to be employed in overcoming this discrepancy.

Records are kept of the complete performance data on each bus so that when a defect of any nature is reported, either in operation or otherwise, the same may be checked for repetition.

In addition to the conventional service in checking bus power plants the Philadelphia Rural Transit officials have found the rheostat beneficial in many ways, such as testing newly developed features for added economy, checking gasoline consumption, timing, etc. In fleet operation of gas-electric buses water rheostats of the character described play an important part in reducing maintenance costs to the minimum and reducing trouble in operation.

Bus	Date	Amperes	Volts	R.p.m.	Water Temperature	Remarks
Temperature of day, 26 deg. C.						
278	9-3-25	200	206	1,385	70	Wide open throttle
		300	118	1,070	75	
		400	77	1,010	85	
Kilowatt-hours per gallon of gasoline, 5.35.						
512	9-3-25	200	167	1,165	56	Wide open throttle
		300	96	1,115	60	
		400	64	875	70	
Kilowatt-hours per gallon of gasoline, 4.52.						

Carborundum Track Brakes

TESTS have been made on a few street railway lines in Europe, including those at Zurich and Basle, with track brakes having a braking surface of carborundum. Two shoes on each side of the car are attached to the truck frame of the single-truck car and are pressed down on the track by air. No sand is required to secure a quick stop. This type of brake is recommended for emergency use only, because it produces considerable wear on the head of the rail.

Plate Glass Chip Guard Used in Detroit

MANY safeguards are used in the shops of the Department of Street Railways, Detroit, Mich. The view shows a simple plate glass guard mounted in a wood frame and arranged in an adjustable holder to fit over the tool clamp of a lathe. Good vision can be gained at the same time, eliminating the possibilities of chips flying into the operator's face.

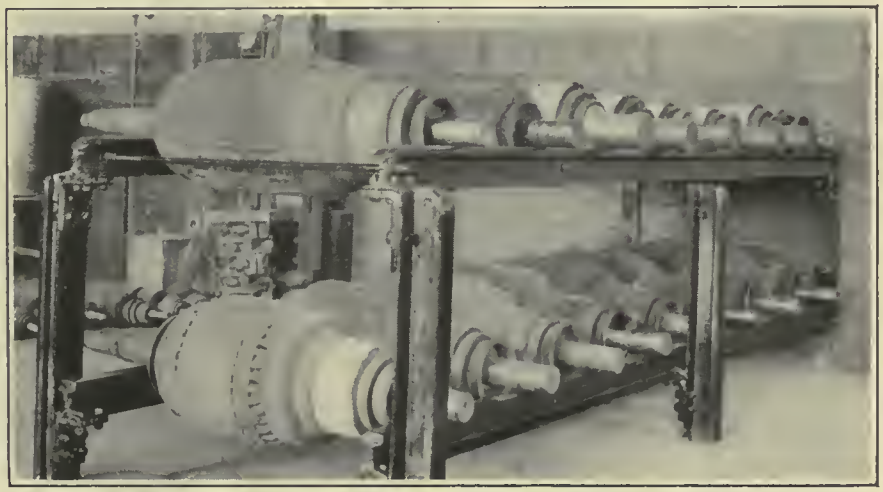
In time the steel chips flying against the glass guard scratch the surface. The glass is so small that its replacement is simple when its condition hampers clear vision.



Plate Glass Protects Operator from Flying Chips

Attractive Armature Rack Made from Old Rails

DOUBLE-DECK armature racks of the type shown in the accompanying illustration, two in number, are used for storage of armatures in the electrical department of the shops of the Erie Railways, Erie, Pa. The upright and horizontal supports for these racks are made of discarded T-rails. The uprights are set in the concrete shop floor and the horizontal members are bolted to these through angle supports at each upright. The racks provide capacity for sixteen armatures. They are 4 ft. high and 12 ft. long. The width of the rack is made sufficient to accommodate the longest type armature used. In placing smaller sized armatures in the rack, which have shafts so short that they will not extend the full width, a pipe is applied over the shafts, at the pinion end, to give the necessary extension.



Armature Racks Made of Discarded Rails as Used in the Shops of the Erie Railway

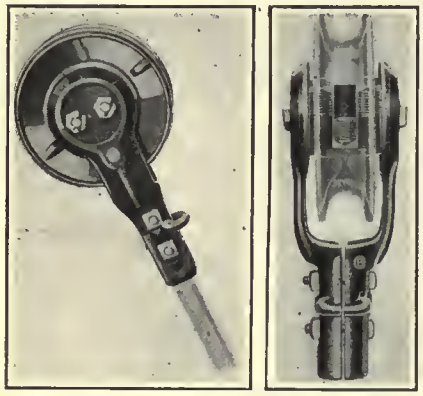
New Equipment Available

Trolley Wheel and Harp

EXCLUSIVE manufacture and sale of a special trolley wheel and harp made under licensed patent owned by T. M. Feist, master mechanic Sioux City Service Company, Sioux City, Iowa, has been taken over by the Ohio Brass Company, Mansfield, Ohio.

The wheel has been adopted as standard on a number of street railway properties and some 1,500 are at present in use. Features of the device are the large axle, providing a considerable bearing area and containing graphite slugs which are pressed outwardly by springs against the bearings of the wheel to provide lubrication. By virtue of this large bearing and special type of lubrication, mileages on the wheels are obtained which average considerably more than the life of the ordinary wheel, according to records kept on a number of properties.

A split harp is used and is fastened to the axle by means of two bolts extending through the axle. This tight clamping of the large machined surfaces between harp and axle provides a low resistance path



At Left, Side View of Trolley Wheel and Harp. At Right, Ample Bearing Area Makes Current Collection Easy

for the current, giving unusually large current collecting capacity without the use of a shunt. It is a feature of this device that it is unnecessary for a carhouse man to lubricate the wheel, as it is claimed that these units will average more than 15,000 miles without any lubrication attention.

Other features of the wheel are the shape of groove used and the particular composition of the metal, which gives an exceptionally tough wheel and contributes materially to the long life obtained. The manufacturer claims that trolley wheel expense can be cut to one-third by using this device. For the past three years the device has been marketed by the Dayton Manufacturing Company, which also manufactures other devices under patents of Mr. Feist.

Overload Relay Is Redesigned

REDESIGN of the temperature overload relay manufactured by the General Electric Company, Schenectady, N. Y., has been made. This relay has two heating elements connected in each two phases, so that complete protection is provided for single, two or three-phase motors. On direct current circuits the heating elements are connected on each side of the line.

The improved relay is known as the form C or PC-121-C. The improvements in design allow the use of renewable heating elements, prevent the bending of thermostatic strips by operators and include a better mechanical construction. The relay is reset by means of a cord and button suspended from the bottom.

Brass Cups for Traffic Markers

MARKINGS which will not corrode nor soon wear away have been developed recently by the Bridgeport Brass Company, Bridgeport, Conn., in the form of brass cups to be inserted in pavements where traffic directions are needed. The new traffic spots are made in two diameters, 3 in. for pedestrian lanes and markings and 4½ in. for traffic divisional lines. They are claimed by the makers to be highly visible, easily inserted and requiring no upkeep. They may be inserted in asphalt, macadam, wood block pavement, Amasite, Warrentite and new concrete pavements.

Once the layout for any particular marking is made, the insertion in the pavement is accomplished by pounding with a flat-faced cast-iron road tamper. Another method which is considerably faster is to lay down the spots where marked and run a steam roller over them.

The new traffic spots are particularly recommended by their manufacturers for use in such markings as street car safety zones, school stops, on dangerous curves and in substitutions for police officers where traffic is light.

Improved Features in Plug Fuse

SEVERAL distinctive features are incorporated in a new non-renewable plug fuse recently placed on the market by the Trico Fuse Manufacturing Company, Milwaukee, Wis., under the trade name of "Cleartop." The fuse consists of a separate porcelain base and body. The base has a long baffle chamber which extends to the inside top of



Body of This Non-Renewable Fuse Is Treated Porcelain, with a Rugged Knurl to Give a Good Gripping Surface

the body and holds the mica window in place. The body and base are held together by a heavy brass screw shell. The body is finished in a dull black, giving the appearance of molded insulation.

Some of the distinctive features are provision of a large rugged knurl around the top edge to afford a good grip when tightening. The fusible strip is made from accurate material and has a restricted blowing portion; each strip has the rated current stamped plainly on the top and is visible through the mica window. The screw shell is made of heavy-gage hard brass, threaded completely. It is rigidly fastened to the body and cannot become loose. The lower end or fusible strip is securely soldered to the bottom contact. The other end is soldered at the base of the screw shell. A vent space is provided around the base so that the gases escape along the exterior of the base within the body and are gradually released along the base. The body and base are molded from a high grade of porcelain. The base supports the mica disk as well as the fuse strip and acts as a fireproof barrier to prevent interior flashovers. A large center contact is riveted to the base.

Association News & Discussions

Welding of Pipe and Pressure Vessels Discussed by Welding Society

WELDING practice as used by electric railways did not form a particular part of the discussion at the annual meeting of the American Welding Society, held April 21-23, in the Engineering Societies Building, New York City. There were, however, several contributions dealing with practical welding problems, particularly relating to piping installations and pressure vessels. Other features were a review of the progress in gas and arc welding, a general symposium on the subject of design, and an inspection trip to the plant of the Metals & Thermit Corporation. There was considerable discussion of research problems in the session devoted to the American Bureau of Welding, and a dinner-dance was preceded by spectacular demonstrations of the properties of liquid oxygen.

New officers for the ensuing year were elected as follows:

F. M. Farmer, president; E. M. T. Ryder, first vice-president; R. L. Brown, A. M. Candy and Stuart Plumley, divisional vice-presidents; C. A. Adams, H. M. Hobart, A. E. Gaynor and A. G. Bissell, directors at large.

On Wednesday morning there was held a well-attended meeting of the gas welding committee, of which S. W. Miller, head of the research laboratory of the Union Carbide & Carbon Corporation, is chairman.

At Mr. Miller's invitation, F. R. Low and C. W. Obert, chairman and secretary respectively of the A.S.M.E. boiler code committee, spoke briefly on the "Unfired Pressure Vessel Code" and the attitude of the code committee on welding. It was pointed out that the committee has no actual authority in matters of construction. Its function was rather to crystallize and codify the best existing practice.

A report from the San Francisco section outlined the preliminary program for research on the strength of welds at high temperatures. This work, in which Leland Stanford University and the University of California are cooperating, will be limited at the start to welds made with commercial welding rods of ordinary firebox steel.

The main feature of the meeting of the electric arc welding committee was a discussion of the results of tests made to determine the effect of such factors as current, size of electrodes, design of joints, positions of welding, etc., as presented by the sub-committee on the fundamentals of arc welding.

This was preceded by a report of the sub-committee on non-ferrous metals. One member reported success in welding aluminum with the electric arc. Another told of the Niagara Power Company's practice in the matter of repairing eroded impellers of hydraulic turbines. These are renewed by arc welding with phosphor-bronze rods.

In a discussion of single-V versus double-V welds (in steel plate) several spoke in favor of the single-V weld as ample for many purposes. Samples were shown of square-end and single-V welds made with a grooved copper backing plate to give excess metal on the back side. The results of tests to determine the effects of size of electrodes, design of joints and other factors on the properties of electric arc welds were presented by H. L. Warner, General Electric Company. There was some disagreement as to the interpretation of the results obtained.

At the Thursday afternoon session S. W. Miller of the Union Carbide & Carbon Research Laboratories, presented a paper on the "Design of Welded Joints with Special Reference to Pressure Vessels," while L. H. Burkhart illustrated design methods by the details of design and manufacture of a welded pressure vessel to meet specific requirements.

The annual meeting of the American Bureau of Welding, which is the research department of the society, took place Friday morning, April 23. Prof. C. A. Adams stressed the importance of fundamental research in the welding field. Some fundamental problems needing investigation in the electric-arc, gas-welding pressure-vessels and structural welding field were outlined.

Two important investigations are being proposed; one in the field of unfired pressure vessels as a joint investigation with the A.S.M.E. to secure information needed by the boiler code committee and designing engineers. The other investigation is being proposed in the field of fabrication of structural steel, in which co-operation is being sought from the American Institute of Steel Construction.

COMING MEETINGS OF *Electric Railway and Allied Associations*

May 6—New England Street Railway Club, Copley Plaza Hotel, Boston, Mass. 3.30 p.m. and 6.15 p.m.

May 7—Metropolitan Section, American Electric Railway Association, Engineering Societies Building, 29 West 39th Street, New York City, 8 p.m.

May 13—Central Electric Railway Master Mechanics' Association, Orlando Hotel, Decatur, Ill.

June 2-4—Canadian Electric Railway Association, annual convention, Quebec, Canada.

June 9-16—American Railway Association, Mechanical Division, annual convention, Atlantic City, N. J. Car matters, June 9-11; locomotive matters, June 14-16.

June 25-26—New York Electric Railway Association, annual meeting, Hotel Champlain, Bluff Point, N. Y.

June 28-July 2—Central Electric Railway Association, summer meeting, S. S. South American, Buffalo, N. Y., to Chicago, Ill.

July 8-10—Midwest Electric Railway Association, annual convention, Brown Palace Hotel, Denver, Colo.

August 12-13—Wisconsin Public Utility Association, Railway Section, La Crosse, Wisconsin.

Oct. 4-8—American Electric Railway Association, annual convention and exhibits, Public Auditorium, Cleveland, Ohio.

Central Electric Penny Coupon Tickets Considered

CERTAIN lines have signified a desire to become party to joint passenger tariff No. 37 of the Central Electric Traffic Association covering the interchangeable 2,000 penny coupon ticket. It was decided at the meeting of the association held on April 21 that before reissuing the tariff an opportunity be given all lines in the association to participate therein if they so desire.

Lines now party to the tariff will be carried forward in the reissue on the same basis as in the present tariff unless advised to the contrary. Lines not party to the tariff are requested to advise Secretary L. E. Earlywine at once if they desire to participate, and if so state whether they will sell the tickets or only honor them.

The only change in the rules will be a provision to make half-fare detachments, which is prohibited in the present tariff. The rate will remain the same as at present, $17.50 for $20 in transportation.

Progress Is Made in International Standardization

AT THE third international standardization conference, held in New York City during the past two weeks, several subjects of interest to electric railways were considered. The meetings were held under the auspices of the American Engineering Standards Committee and delegates of eighteen national standardizing bodies were present. At previous conferences the committee on traction motors had reached complete unanimity except on two points, on which decision had been reversed by the French delegation. The

points in the report were: (1) Application of I.E.C. rules to all types of traction motors. (2) Two classes of I.E.C. ratings, one hour and continuous. (3) Temperature rises. An ambient temperature of 25 deg. C. was chosen as a basis for comparable tables. Temperature measurement by resistance method was favored, but thermometer measurements were permitted under certain conditions. Temperature rises were specified. (4) Conditions of excitation during the test must correspond to the ratings of the motor. (5) The voltage during test of ventilated motors should be the rated voltage for both continuous and one-hour rating tests. For totally inclosed motors the one-hour test should use standard voltage and continuous rating test should use either three quarters or one-half rated voltage as specified in the particular case. The points in the report enumerated above were approved.

At another meeting the possibility of arriving at a compromise between British standard Whitworth and American national standard screw threads was discussed. Sir Richard Glazebrook, former director of the National Physical Laboratory of Great Britain, and who represented the British Engineering Standards Association, read a paper on a slightly modified screw thread developed on the basis of a suggestion by a member of the American sectional committee on screw threads. This screw thread would have an angle of thread of 57½ deg., which lies midway between the 55 deg. angle of the British standard Whitworth thread and the 60 deg. angle of the American national standard thread. If this thread is adopted there will be no difficulty in mating a bolt threaded in the new way with a nut either of the British standard Whitworth or the American national standard tapping.

Definite action was not taken at this conference, but it was decided to have the proposal circulated among the different national standardizing bodies in order that they might study the proposition.

At another conference the question of international standardization of bolts and nuts was considered. Representatives of the sectional committee of the American Engineering Standards Committee presented reports showing tentative standards which had been agreed upon and which it was thought would ultimately be adopted. Sir Richard Glazebrook, the British delegate, described experiments which the British association had been making, which seemed to indicate that much smaller nuts and bolt heads than now used in England could be adopted with satisfactory results and at less cost than the ones now used in England. In order to make further progress in standardization of bolts and nuts, the conference formally requested the British Engineering Standards Association to continue the experiments which it is making and all other national standardization bodies were requested to send to the British Engineering Standards Association any tentative standards which they are considering or standards which have been adopted by various manufacturers in different countries. These are to be analyzed and tabulated by the British association and then circulated to all of the twenty national bodies for consideration in connection with further proposals toward international standardization.

Central Master Mechanics Meet May 13

IN ACCORDANCE with the action taken at the last meeting the next regular meeting of the Central Electric Railway Master Mechanics' Association will be held at the Orlando Hotel, Decatur, Ill., commencing at 10 a.m., Thursday, May 13. Hotel reservations should be made through J. D. Barnhart, Box 97, Illinois Traction System shops, Decatur, Ill.

"The Care of Air Brakes with the View of Obtaining the Maximum Degree of Efficiency and Safety" is one of the subjects for discussion. "The Painting of Cars, Brush vs. the Spray Method" is a second subject.

In addition to these two papers the program will include reports of committees, including the report of the special committee on freight car lighting, general business, and the open forum.

After the conclusion of the regular program an opportunity will be given to visit the shops of the Illinois Traction System at Decatur.

New England Club Meets May 6

"MATERIALS and Supplies—How to Economize" will be the subject of a symposium at the afternoon meeting of the New England Street Railway Club to be held at the Copley Plaza Hotel, Boston, on Thursday, May 6. The meeting will be called to order at 3:30 p.m.

Short talks will be given as follows: "Co-ordinating the Work of the Engineering Force and the Purchasing Department," by George E. Haggas, chief engineer Cumberland County Power & Light Company, Portland, Me.; "Quantity or Seasonal Buying vs. Hand to Mouth Buying," "Manufacturers' Standards and Specifications vs. Company Standards and Specifications," "Policy of Manufacturing Supplies by Railway Companies," by R. S. Baldwin, purchasing agent the Connecticut Company, New Haven, and A. B. Fuller, purchasing agent Union Street Railway, New Bedford, Mass.; "Storeroom Practices," by William F. Crowe, corporation secretary Springfield Street Railway, and R. A. Weston, special accountant the Connecticut Company, New Haven; "Control of and Reduction of Inventory," by W. F. Maher, storekeeper United Electric Railways, Providence, R. I.; "Monthly Budget System," by Thomas F. McGarry, purchasing agent Eastern Massachusetts Street Railway, Boston, and "Simplified Practice and Obsolescence," by William W. Tirrell, statistician, formerly examiner for the Interstate Commerce Commission.

The evening meeting, following the dinner at 6:15 p.m., will be held in the Swiss Room of the Copley Plaza Hotel and will be devoted to the subject "How to Make the New England Street Railway Club of More Value to Railway Companies," by L. S. Storrs, managing director American Electric Railway Association, and George E. Pellissier, assistant manager Holyoke Street Railway. "Harnessing Our Energies" will be a spectacular electro-magnetic phenomenon illustrated by experiments never before attempted, by Harry C. White, Edison Lamps Works of the General Electric Company.

Central Traffic Association Constitution to Be Amended

REVISION of the meeting time of the Central Electric Traffic Association was proposed at the meeting of this association held in Akron, Ohio, on March 17-18. The committee on constitution and by-laws presented the following amendment to Article V, Sec. A of the constitution.

The association shall meet on the third Wednesday of the following months: January, February, March, April, May, August, September, October, November and December, the January meeting being considered the annual meeting. Special meetings may be called at any time and place upon the request of twelve members.

This amendment has been brought to the attention of the members in a bulletin from Chairman L. E. Earlywine of the committee. It will come up for action at the next regular meeting of the association.

American Association News

Engineering Symbols

VARIOUS groups of symbols which are to be included in the report of the special committee on engineering symbols of the American Electric Railway Engineering Association were decided upon at its meeting held at association headquarters, New York City, April 20. Those present were: H. W. Codding, chairman; J. D. Kent and C. W. Squier. The committee analyzed a large amount of material and agreed upon the symbols most used by electric railways. These were grouped into the following classifications: Topographical, railway signal symbols, electrical symbols, mathematical symbols and general railway symbols.

Final drawings are being made up of all the symbols which in the opinion of the committee should be included in this report.

Metropolitan Section Aims for Membership of 1,500

SETTING a bogey of 1,500 for membership at the end of the current year the Metropolitan Section, A. E. R. A., is making real efforts to reach this goal. The bulletin of the April meeting gave the membership figure as 1,182. Attention was called to the attendance at the monthly meetings, which has been considerably under a satisfactory total for some time. Members were urged to form the habit of regularly setting aside the first Friday of each month for the section meeting. An expression of individual preference for a summer outing or an October smoker was asked from the members.

The News of the Industry

Tayler Grant of Cleveland Railway Amended

The Cleveland Railway, Cleveland, Ohio, was granted a new franchise by the City Council on April 19. The new grant is a modernized version of the Tayler ordinance. It will run until 1950. It authorizes the Cleveland Railway to operate buses, creates a metropolitan transportation board of four Clevelanders and one member for each suburb, permits the company to pay 2 per cent commission on stock sales, raises the possible maximum fare to 10 cents instead of 6 cents, fixes the rate of fare in contiguous suburbs 1 cent higher than the Cleveland rate and changes the interest fund.

Under the amended franchise fares will go up if the interest fund falls below $500,000 and fares will go down if the interest fund rises above $1,100,000.

The new franchise was passed by the Council by a vote of eighteen to six. The Council previously had turned down a proposed amendment which would have forced recognition of the union.

W. R. Hopkins, City Manager, declared that the railway will now be in a position to attract private capital and to command an ample market for the sale of its securities in order to solve the city's transportation problems. The amended franchise will become effective on June 5. The Cleveland Federation of Labor has threatened to initiate a referendum on the amendments.

Following passage of the amendments the stock of the company jumped three points to 96½, and it is planned to sell $4,000,000 of stock as soon as the quotation reaches 100, or par.

John J. Stanley, president of the company, said the company will accept the new franchise. He ordered a notice posted in all carhouses giving the platform men an increase in pay. Effective May 1, 1926, and until further notice, the wage scale for motormen and conductors will be 65 cents an hour for the first three months of service, 68 cents an hour for the next nine months and 70 cents an hour thereafter. This is an increase of 5 cents an hour. All working conditions will remain unchanged.

Preparing for the Operation of Rochester's Canal-Bed Line

That the railroad built by the city of Rochester, N. Y., in the bed of the abandoned Erie Canal will be in operation this fall was indicated by action of the Board of Contract and Supply in awarding bids for bridge construction, specifying that the work must be done by fall.

No decision has been reached as to who will operate the line when it is completed. It is regarded that the New York State Railways, operating the local trolley system, is the only company equipped to take over the railroad. Municipal operation, it is believed, will not be deemed practicable.

The section of subway to be in use first will be from Oak Street, its western terminus on the west side of the city, to connections with two electric and two steam railroads in the extreme eastern outskirts. The line bisects the heart of the city. An overhead street of a mile has been built in the business section.

Although the Erie Canal, long since abandoned, traverses Utica and other New York State cities, Rochester is the first to make this use of the old "big ditch" of George Clinton.

The city railroad will connect with all the steam lines entering the city and will do considerable freight hauling and switching besides taking care of all interurban trolley traffic entering Rochester.

A study of operation is under way by a committee of citizens named by Mayor Clarence D. Van Zandt and headed by John P. Morse.

The city board has also authorized bids for electrical wiring for the road.

New Franchise Suggested at Fitchburg

The Fitchburg & Leominster Street Railway, Fitchburg, Mass., will seek a new franchise in that city to include the operation of buses as part of a scheme for extensive reorganization. The new franchise seeks to establish the right of the company to operate buses over a score of streets and into sections not now served by trolleys. If the new franchise is granted the right to operate buses in the city would be limited to the railway, with adequate provision made for the development of the service in the interest of the public.

Pittsburgh Considers Subway

City Transit Commission Indorses Turner-Haydock Plan and Proposes $30,000,000 Bond Issue—Rapid Transit Line to Be Operated by Pittsburgh Railways

ANOTHER step toward providing Pittsburgh with rapid transit is taken in the report recently submitted to the Mayor and City Council by the City Transit Commission. It approves the immediate construction, after the financing preliminaries have been arranged, of the first part of the rapid transit system recommended by Daniel L. Turner, consulting engineer, and Winters Haydock, chief engineer, of the Department of City Transit. It also includes a report by these engineers supplementing that presented on Jan. 23, 1925, and published in abstract on page 409 of the issue of this paper for March 14, 1925.

The sections approved are a subway from the vicinity of Federal and Ohio Streets on the north side, by way of Federal Street and Fifth Avenue at least as far as Neville Street, in the Shadyside district, to be used by rapid transit trains, and another subway, less than a mile in length, on Grand Street, in the downtown section, crossing the other at right angles, to be used temporarily by surface cars. Later, this would form part of a rapid transit line.

The City Transit Commission recommends the construction of these lines by the city and their lease to the Pittsburgh Railways under a contract of a nature similar to that under which the present surface railway system is operated, or under a "service at cost" franchise. Under this contract the railway would supply the rolling stock, electrical equipment and terminals. The city's contribution would be $36,000,000 and the railway's $4,860,000.

The report of the engineers declares that by the rerouting which would follow the opening of the north side subway in 1932 the railway could save 4,250,000 surface car-miles by the substitution of 2,240,000 rapid transit car-miles. On a basis of 30 cents per car-mile for the former and 25 cents per car-mile for the latter, a net saving in operating cost for the year of $715,000 would be obtained. If the company substituted one-man cars on its remaining surface routes, it would make an additional saving of $595,000, or a total possible yearly operating saving of $1,310,000 as of 1932, due to the construction of the proposed rapid transit line. From the operation of the Grand Street subway it is estimated an additional saving of $112,000 could be obtained.

The engineers recommend that from this net gain of $1,422,000, which does not include any allowance for increase in traffic, $291,600 could be taken to pay the additional carrying charges of the company required under the plan. This would leave about $1,130,400 to be applied toward the carrying charges of the bonds issued by the city. The city has already authorized an expenditure of $6,000,000 for subway purposes, so that an additional $28,940,000 is required to pay for the subways without equipment, but a considerable part of this, as explained, will carry itself. The commission therefore recommends a referendum at the next election on the question of authorizing the city to float an issue of bonds to the amount of $30,000,000.

$22,000,000 Order Issued

New York Commission Votes Two to One to Require Interborough to Proceed with Plans

Orders issued by the New York Transit Commission to the Interborough Rapid Transit Company, New York, require that company to spend approximately $22,000,000 on lengthening station platforms and buying new cars and equipment. The order requires the company to pay one-half (about $6,000,000) of the cost of lengthening 56 underground platforms and 23 elevated platforms at local stations to accommodate ten-car trains. The city is required to pay the other half. The order also requires the Interborough to buy 382 new cars, costing about $10,000,000, and spend about $6,000,000 for signals, repair sheds, power equipment, etc.

ORDER EFFECTIVE JULY 1

The order becomes effective on July 1 next. Chairman George McAneny and Commissioner Le Roy T. Harkness concurred. Commissioner John F. O'Ryan filed a dissenting opinion. He held that lengthening platforms constituted "new construction" rather than "additions" to the Interborough system, and, therefore, was not included in the provisions of the dual contracts under which the order was issued.

Mr. McAneny in his opinion stated the subway division of the Interborough system showed a good profit and its losses were due to the lease of the elevated lines. He declared the company could find money to finance the improvement even if it were forced to go through bankruptcy to dissolve its unprofitable elevated lease.

The opinion of Messrs. McAneny and Harkness stated in part:

The Interborough company, as a single corporation, is operating two separate railway systems—(a) the system of subways it has leased from the city under Contracts Nos. 1, 2 and 3, and (b) the system of elevated lines it leased from the Manhattan company in 1903, for a 999-year term. In pleading its financial situation it presents, and asks that the commission take into account the joint financial statement of both its subway and elevated lines. Upon such a joint statement the company, for its last fiscal year ended June 30, 1925, showed a net deficit of $345,508.

The losses on the Manhattan elevated division for the year—figured after the payment of $3,065,310 by way of rentals to the holders of Manhattan company stock—were $4,533,757. During the same period the earnings of the company under the subway lease, over operating costs and financial or other charges of every description incidental to its operation under those leases, was $4,188,249. The net deficit stated for the year is the product of the merging of these two sets of operating results.

The indicated profit from the subway division for the current fiscal year—that is, for the year that will end June 30 next—is $5,500,000.

SUGGESTS HELP FROM CITY

Chairman McAneny suggested that the city might raise the money and lend it to the Interborough as the city can borrow more cheaply than the company. He made the alternative suggestion that the city might alter its contract with the Interborough so as to pay the entire cost of lengthening the platforms, on the ground that the city is a partner of the Interborough and will benefit by the improvement.

Officials of the Interborough Rapid Transit Company refused to comment on the decision, but it was stated that the company hopes the matter may be arranged without litigation and without forcing a receivership.

Brotherhood Will Handle Own Benefits in Kansas City

The Benefit Unit of the Kansas City Railways Employees' Brotherhood of Kansas City, Mo., was recently organized and later authorized by a decree of the Circuit Court of Jackson County. The brotherhood health and accident benefits, which have for the past seven years been underwritten for it by the Massachusetts Bonding & Insurance Company, will be administered by the Benefit Unit. The necessity for making the change was brought about by the Massachusetts Bonding & Insurance Company serving notice of an increased rate effective March 1. After an examination of the experience of the carrying company for the past three years, it became apparent that with a low administrative cost the brotherhood could itself handle these benefits at the rate formerly paid the Massachusetts company and grant benefits similar to those allowed in the past. The articles of agreement provide that the Benefit Unit is a corporation organized solely for beneficial purposes and not as a profit-making venture. This change does not in any way affect the group life insurance which has been carried for many years by the Aetna Life Insurance Company.

Record-Breaking Weekly Pass Installation at Wheeling

Weekly passes greater in variety than have heretofore been installed at one time will be put into effect on May 3 by the Wheeling Traction Company, Wheeling, W. Va. This company's patrons are already familiar with the Sunday-holiday pass, of which twelve types are in use. The weekly passes will number eighteen types, as follows:

RECORD-BREAKING WEEKLY PASS INSTALLATION AT WHEELING

Name of Pass	Riding Limits	Price
Wheeling	Eighth Street, Benwood, and Stop 1, Wheeling	$1.00
Greater Wheeling	Eighth Street, Benwood, and Stop 24, Warwood	1.25
McMechen	Stop 19, McMechen, and Stop 1, Wheeling	1.65
Moundsville	Moundsville and Stop 1, Wheeling	3.25
Glendale	Stop 21, Glendale, and Moundsville	0.85
Wellsburg	LaBelle Mine, Wellsburg, and Steubenville	2.75
Follansbee-Steubenville	Follansbee, south corporation limits, and Steubenville	1.50
Universal	All routes	5.00
Weirton	Steubenville and Weirton	2.25
Brilliant	Steubenville and Brilliant	2.00
Mingo	Mingo, south corporation limits, and Steubenville	1.00
Brookside	Fourteenth Street, Wheeling; Aetna Street, Martins Ferry; Stop 14, Brookside, and Stop 9, West Wheeling	1.00
Martins Ferry	Fourteenth Street, Wheeling, and Stop 6, Martins Ferry	1.25
Ohio	Fourteenth Street, Wheeling, Stop 6, Martins Ferry; Stop 26, Lansing, and Stop 27, Bellaire	1.75
Shadyside	Fourteenth Street, Wheeling; Shadyside, Stop 6, Martins Ferry, and Stop 26, Lansing	2.50
Linwood	Fourteenth Street, Wheeling, and Stop 40, Linwood	2.00
Ohio Terminals	Fourteenth Street, Wheeling; Rayland, Barton and Shadyside	3.00
Beech Bottom	Eighth Street, Benwood, and Stop 51, Beech Bottom	2.00

The present basic cash fare of the Wheeling Traction Company is 8 cents, with ticket rates of 5 cents (ten for 50 cents) in West Virginia and 5 5/9 cents (nine for 50 cents) in Ohio, but there are also combinations making use of 6¼-cent, 7 1/7-cent and special commutation rates. The prices of the passes range from eleven to twenty times the fare of riders on tickets, depending upon the nature of the traffic.

Committee of Chicago Aldermen on Tour of East

Chicago Aldermen, on tour to inspect the transit situation in various cities of the eastern United States and Canada, arrived in New York on April 28 and are at the Waldorf-Astoria.

The committee has visited Detroit, Cleveland and Philadelphia and will leave for Boston on May 1, after which it will stop at Montreal and Toronto, returning to Chicago May 6. Joseph B. McDonough, chairman of the committee, said:

Chicago is planning to build subways from "the Loop" district, into which 700,000 pour daily. We are told that New York City made a mistake in not building its subways by special assessment instead of out of its transit fund, and we are here to investigate the subway problem. Philadelphia is making great progress, but doesn't seem to know what to do with her subways after they are built.

New Franchise at Richmond Ready for Council

At the conclusion of a three-hour discussion on April 27 the streets committee of the City Council of Richmond, Va., practically completed its report on the proposed blanket franchise to be submitted to the Common Council on May 3. Vice-President W. E. Wood and Counsel T. Justin Moore for the Virginia Electric & Power Company said that in the main the grant meets with the approval of the company. After a few unimportant amendments, the document was recommended for approval.

At 5 o'clock Monday afternoon, May 3, the committee will review the finished document and forward it to Council that night for discussion at a date to be fixed later.

There was considerable discussion as to the right of the city to fix a valuation of company's property, but it was finally agreed that the figure of $9,494,800 set in the Virginia State Corporation Commission's valuation for rate fixing was probably the most equitable. This figure is a compromise between the valuations made by Stone & Webster and John Beeler, the latter employed by the city. The committee expressed the belief that the proposed valuation and the accompanying features of the franchise were the best obtainable. With this unanimous report from the streets committee, it is believed the document will have clear sailing through both branches of City Council.

Violation of Labor Contracts Before Indianapolis Court

Legal steps, believed to be preparatory moves toward the filing of a motion to have members of the Amalgamated Association cited for contempt of court, were taken in the federal court in Indianapolis on April 24 by attorneys for the Indianapolis Street Railway, Indianapolis, Ind., and the Terre Haute, Indianapolis & Eastern Traction Company, Terre Haute, Ind. On motion of the attorneys, Judge Robert C. Baltzell substituted the name of the Indianapolis Street Railway for the name of the Indianapolis Traction & Terminal Company as the plaintiff in a suit for an injunction which was granted by Judge A. B. Anderson in the federal court in May, 1924, thus bringing the injunction up to date. It was reported that attaches of the Amalgamated Association recently attempted to persuade employees of the two Indianapolis companies to violate their labor contracts with the company. The contract, according to attorneys, provides that the employees of the company shall not quit the service in a body.

Rythmical Vibrations Help Hearing

Recent tests conducted on a trolley car in New York by Dr. Paul Winslow, otolaryngologist, Dr. E. L. Cross, principal of the Wright Oral School for the Deaf, and F. W. Melano, representative of Dr. E. E. Free, who recently located the noisiest corner in New York, resulted in declaration by three deaf men that rythmical vibrations enabled them to hear better. First a voice test was made and then two other tests of a more mechanical nature. A student from the Institute for the Improved Instruction of the Deaf signified that he heard the buzzing of an audiometer at a distance of 25 in. when the car was still, and could make out the noise when the trolley rattled at a good speed. The other test, in which the audiometer was set at its maximum intensity of 100 so that an almost totally deaf person could hear it, was productive of similar results.

Final Westchester Rapid Transit Report Is Submitted

The final report of the Westchester County Transit Commission on the proposed rapid transit system between downtown New York and principal cities in Westchester County has been presented to the Board of Supervisors of Westchester County. It includes a report by the engineer of the commission, Henry M. Brinckerhoff, dated March 1, together with the text of Mr. Brinckerhoff's report of Dec. 15, maps, etc. Previous references to this proposed rapid transit system have appeared in the issues of this paper for Dec. 19, 1925, page 1086, and Feb. 7, 1925, page 214.

In its final report the Westchester County Transit Commission reviews briefly the eight other comprehensive plans for caring for New York's suburban passenger service. Some of these, as the transit commission plans of 1924 and 1925 and the New York, Westchester & Boston plan for a distributing system at 125th Street, are not considered satisfactory for Westchester commuters. But the commission does express the belief that a combination is possible between the Westchester plan and the loop in New York City for suburban passengers, proposed by the North Jersey Transit Commission. This possibility is considered more at length in the engineering report of Mr. Brinckerhoff, who believes the two plans can be harmonized and combined with a saving of large sums in construction and greater economy of operation than by building and operating separate systems.

The report also devotes considerable space to the need of cross-country bus lines to act as feeders for the rapid transit system at its northern end. Data on existing bus lines and those for which franchises have been requested are given in the report.

Safety Committees Formed in Springfield

A definite idea of safety with a well-arranged program of activity leading to that objective has been the policy of the Indiana, Columbus & Eastern Traction Company, Springfield, Ohio. Its plan includes a carefully selected organization with various committees comprising the general safety committee. H. P. Smith is director of safety of the company and ex officio head of the general safety committee. The accompanying illustration shows the men selected to head the many committes when the annual reorganization meeting was held last fall.

During the twelve months ending Aug. 31, 1925, the Indiana, Columbus & Eastern Traction Company and its subsidiary bus lines, the Dayton & Columbus Transportation Company and the Springfield & South Charleston Transportation Company, carried 2,198,953 passengers without a fatal accident to a passenger, according to a report made public by J. M. Pogue, general manager. The company operates seventeen daily passenger trains between Springfield and Columbus; eight between Springfield and Lima; eighteen buses between Lima and Columbus and seven buses between Springfield and Lima.

Staten Islanders Want Railway Line Continued

The Staten Island Civic League has drawn up a report strongly opposing withdrawal of the municipal trolley lines and three "trackless" lines contemplated by the city of New York. Copies of the report were sent to the Board of Estimate and the Board of Transportation.

The action, which would result in the removal of the lines, is contemplated on the ground that they are operated at a loss. Five years ago under the Hylan administration the city started the "trackless" trolleys and took over five lines operated by the Midland Railroad. It has since operated them on a 5-cent fare.

Recently it was reported that the venture was costing the city approximately $250,000 a year. This report was followed by an announcement that the city intended to withdraw the cars unless it could get a substitute company to operate them.

The league opposes the move on the ground that the action would not be in conformity with the city's policy in other regards. It approves a comprehensive bus system, with free transfers from bus to bus and from buses to cars which the buses feed.

Honor for Railway Man.—C. D. Emmons, president of the United Railways & Electric Company, Baltimore, Md., was elected a member of the board of directors of the Baltimore Association of Commerce at the annual meeting of the organization on April 22.



Heads of Committees Comprising General Safety Committee

Left to right, from row—Ralph Mitman, motive power; J. M. Schneider, carhouse and shops; A. N. Allen, conductors, and Samuel Black, maintenance. Rear row—F. N. Mailing, agents and clerks; Charles Killinger, buses; L. K. Linkhart, motormen; Henry Aiple, general offices, and Fred Harman, freight division.

Ten Cents in Sioux Falls—Paving Relief Granted

At the annual city election in Sioux Falls, S. D., on April 20 the people voted to raise the railway fares of the Sioux Falls Traction Company to 10 cents, the same as the present bus fare, with tokens sold fifteen for $1, instead of seventeen as at present. The car fare has been 6 cents. The granting of the right to the company to raise its fares was given by nearly a two to one vote. The opposition registered 1,851 votes and the advocates totaled 3,612. With reference to its petition for relief from paving the company won by only a majority of 390.

A committee recently investigated the precarious situation alleged to have existed on the Sioux Falls property and the admitted operation at a loss. It recommended relief for the traction company in order to keep cheap transportation in all parts of the growing city after noting a decrease in patronage, increase in operating expense and a loss in gross revenue. The report of the committee also stressed the loss in bus business. The buses, which started operation in 1923, produced a net revenue of $2,149 in 1924, but in 1925 produced a net loss of $2,048. The number of passengers also fell off in 1925 compared with the number carried in 1924; that is, from 598,511 in 1924 to 557,682 in 1925. The committee's report was submitted to the City Commission, with the result that the ordinances were passed for submission to the voters on April 20.

Vote to Relieve Beaver Valley Property of Paving Burden

Citizens of Monaca, Pa., recently adopted a resolution to relieve the Beaver Valley Traction Company, New Brighton, of its obligation to pave between the rails in Monaca, in the event that it agrees to reconstruct its tracks with steel ties on concrete foundation. The resolution came after a citizens' meeting with the Council to discuss the responsibility of the company in paving its part of Pennsylvania Avenue and Ninth Street. C. D. Smith, general manager of the company, presented figures and charts of the operation of the street cars in general in the valley, and also the operation and maintenance of the system in Monaca. The operation of the cars in Monaca showed a deficit of approximately $5,000 last year, and for that reason the company could not financially assume the expenditure that would be required in taking care of the company's share of the paving as specified in the franchise under which the company was operating.

Mayor Grants San Francisco Men Forty Cents Increase

Mayor James Rolph, Jr., of San Francisco, Cal., instructed the Board of Public Works on April 21 to award platform men employed by the San Francisco Municipal Railway a wage increase of 40 cents a day. The increase will raise the daily pay of platform men to $5.80. It will not, however, affect the salary of trackmen, repair men, janitors, or clerks. The increase will be paid out of the present income of the road and will not necessitate an increase in the present 5-cent fare.

The railway officials told the Mayor that there was a surplus of $90,000 in the operating fund of the road that might be applied immediately toward the raise, and that the income of the line would be sufficient to meet the increased overhead.

The Mayor's order came after an eighteen months campaign waged by the employees of the municipal railway for an increase in pay. The original demand was for an additional $1 a day. When it appeared that this was impossible of fulfillment, the amount was reduced to 60 cents a day. The 40-cent increase suggested by the Board of Supervisors was referred to in the ELECTRIC RAILWAY JOURNAL, issue of April 17, page 691.

North Shore & Waukegan Incorporated

To provide a legal means of adding to its electric railway service and putting on buses and taxicabs in Waukegan, Ill., city service the Chicago, North Shore & Milwaukee Railroad recently incorporated the North Shore & Waukegan Railway. The Chicago, North Shore & Milwaukee Railroad operates city service cars and also certain trains on its main line in the town of Waukegan. Questions arose about the legality of expansion under the present charter, so new articles of incorporation were filed, in which certain department heads and officials of the parent company were named. The capital of the new company is $2,000. The incorporators are Warren Nichols, Joseph M. Griffen, Frederick E. Stout, Frank L. Wolf and A. C. Spier.

News Notes

Beach Service Resumed.—With the resumption of service by the Nantasket Beach Steamboat Company, Boston, Mass., the electric railway operated by the New York, New Haven & Hartford Railroad on the Nantasket Beach branch between Nantasket Junction and Pemberton has also been started.

Wants Cars in Baltimore Rerouted.—The Baltimore Traffic Survey Commission has petitioned the Maryland Public Service Commission for an order requiring the United Railways & Electric Company to reroute its cars in accordance with the outline of the survey commission's report. The Public Service Commission has set no date for a hearing. The hearings will be public.

"News and Views" Chosen.—In a contest conducted among the patrons of the Milwaukee Electric Railway & Light Company, Milwaukee, Wis., to select an appropriate title for its new publication containing news of the company's activities the name of "News and Views," submitted by two Milwaukeeans, was selected by the judges as the best. Each received the prize award of $100. This news bulletin will appear at frequent intervals in company cars and buses.

All's Well in Virginia.—The people of Virginia are pulling together for the progress and development of the state, in the opinion of the Virginia Electric & Power Company expressed in a letter by Luke C. Bradley, president, to the stockholders. The letter states that matters inside the company and agencies outside the company are all working to push the expansion program of the company. Stockholders were urged to write to the company frankly on any matter pertaining to company operation.

Railway Helps Community Fund.—The Memphis Street Railway and the Memphis Power & Light Company of Memphis, Tenn., on April 14 submitted a joint subscription of $15,000 to the Community Fund Campaign. This was the largest subscription.

Adjournment in Utica Fare Case.—After examination of several witnesses on April 27 an adjournment was taken by the Public Service Commission to a date to be fixed later in the matter of the application of the Utica lines of the New York State Railways for permission to increase trolley fares. A rate will be fixed after engineers of the commission have completed their inventory of the Utica lines.

Railway Robber Sentenced.—Robert Steele of Carbondale, Ill., who held up and robbed the passengers of the Murphysboro & Southern Illinois Railway 1 mile west of Carbondale several weeks ago has been sentenced to serve from three to twenty years in the southern Illinois penitentiary at Chester, Ill. He pleaded guilty in the Circuit Court at Murphysboro, Ill., April 20.

Railway Service to Mount Royal.—The Montreal Tramways, Montreal, Canada, on April 4 installed a new railway service to Mount Royal, a town of 1,250 population. This new line marks the linking up of Mount Royal with the city by railway. Hitherto the common connection has been through the mountain tunnel by the Canadian National Railways. Mayor Darling of the town said that the new service would be of great assistance to those who are employed in the eastern portion of Montreal. He believed that this line would not be in competition with the Canadian National Railways through the tunnel under the mountains, but would supplement it.

Reward for Accident Prevention Work. — Trainmen of the Oklahoma Railway, Oklahoma City, Okla., are to receive a bonus for accident prevention work. George A. Henshaw, receiver, who explained the plan, said that the total number of accidents each month would be compared with the total for the corresponding month of last year, and for each unit by which the total was reduced the company would pay the trainmen's fund $10. The trainmen may allow the money to pile up in a fund until the end of the year, then divide it among themselves as a Christmas bonus, or they may use it to defray the expense of a number of entertainments or social events, or in any other way they deem desirable. Automobile drivers and the public in general are asked to help the trainmen increase earnings by preventing accidents.

Recent Bus Developments

Bus Merger Plans Before Indiana Commission

Plans for the consolidation of all Insull-owned bus lines in the northwestern part of Indiana into one new bus company to be known as the Shore Line Motor Coach Company were outlined before the Public Service Commission on April 22, when a hearing on the proposal was held. This merger was referred to in the ELECTRIC RAILWAY JOURNAL, issue of April 10, page 650. Evidence also was heard at the hearing on another proposal. This provides that the Gary Railways and the Chicago, South Shore & South Bend Railroad buy most of the capital stock of the new Shore Line Motor Coach Company. In all 24 bus lines would be consolidated in the proposal, of which 21 originally were obtained and now are operated by the Gary Railways. The entire purchase price is $272,188. The Shore Line wants to sell $400,000 of common stock and to use $163,546 for necessary additional equipment.

Sightseeing Operation at New York a Subterfuge

Supreme Court Justice George H. Taylor, Jr., at White Plains, N. Y., on April 26 handed down two decisions enjoining the operation of sightseeing buses from New Rochelle to Manhattan.

Action against these companies and the Mount Vernon Sightseeing Bus Company, which previously was enjoined, were brought by the Westchester Electric Railway, a subsidiary of the Third Avenue Railroad, New York. The plaintiff contended the bus companies had not obtained certificates of convenience and necessity.

It was reported in White Plains that the three bus companies will carry an appeal to the Appellate Division of the Supreme Court. The companies mentioned in the injunctions granted on April 26 were the Luna Cars, Inc., and the New Rochelle Sightseeing Bus Company. They operated seventeen buses between New Rochelle and Times Square. Justice Taylor said:

> It is admitted that the certificate of convenience and necessity, which under the transportation corporation law I hold to be prerequisite to the lawful operation of its line, has not been obtained. Provisions of Section 25 have been wholly ignored by the operations of the defendants.

Justice Taylor also directed a prompt trial of the case. Albert Davison appeared as counsel for the railway. The permits to the sightseeing buses were issued by the officals of Mount Vernon and New Rochelle.

Kentucky Buses Under New Rule

Kentucky buses are now operating under a new law following the signing of a House bill by Gov. William J. Fields. The bill levies a tax of $1 a hundred pounds on the gross weight, a license tag fee ranging from $10 to $50, according to capacity, and a fee, ranging from $5 to $15, on each seat. It creates the office of Commissioner of Motor Transportation, who has authority to grant certificates of convenience and necessity and fix routes, schedules and fares. Limited review by a circuit court is provided. Certificates are revocable for cause, but are renewable annually on payment of fees. Existing lines are protected.

The law covers all motor vehicle passenger common carriers, including taxicabs, except school and funeral buses, which are specifically exempted. Buses operating entirely within municipal limits are also exempted. The commissioner is permitted to fix the size of the required accident indemnity bond.

Bus Service for Crippled Children at Toronto

Transportation of crippled children by bus began in Toronto, Ont., on April 14. Three buses are operated in the morning and three in the evening with the following routes:

> Route No. 1 will be operated by a bus off the Rosedale route, leaving Bloor and Sherbourne at 8:55 a.m., then following Route No. 1 as laid out, arriving at the school around 10 a.m.
>
> Route No. 2 will be operated with a coach running off the Hill route around 8:50 a.m. This coach will travel via Lakeshore Road to the commencement of the No. 2 route and work outward toward Wellesley Street school, arriving there around 9:50 a.m.
>
> Route No. 3 will be covered by a separate bus run off the Jane route, leaving Bloor and Jane at 9 a.m., operating over the route as laid out toward Wellesley Street school, arriving there around 10 a.m.

The total number of route-miles is 55.20. The total number of hours for this work is six hours and 55 minutes, nearly 8 m.p.h., and the revenue derived is approximately 50 cents per bus-mile.

Miss Milne, of the Department of Education, is satisfied with the service.

Route No. 3 operates the separate school bus, commencing at 8:30 a.m., then runs onto the crippled children routes and also does two services in the evening.

These services are not costing the commission anything in the way of bonuses or overtime. Straight time is paid to the amount of six hours and 55 minutes.

Youngstown Company Extends Bus Service

The Pennsylvania-Ohio Coach Lines Company, bus subsidiary of the Pennsylvania-Ohio Electric Company, Youngstown, Ohio, recently took over the operation of the lines heretofore operated by the Cleveland, Warren & Youngstown State Company. Permission for the purchase of the lines was granted by the Ohio Public Utilities Commission. With the acquisition of the Cleveland, Warren and Youngstown lines the bus lines of the Youngstown company extend from Cleveland and Akron throughout this region eastward to Sharon, Greenville, Meadville, Conneaut Lake, New Wilmington and New Castle, Pa.

Electric Railway Victor Over Steam Line

The Minnesota Railroad and Warehouse Commission has denied permission to the Northland Transportation Company, a subsidiary of the Great Northern Railroad, to compete with the buses of the Twin City Motor Bus Company, subsidiary of the Twin City Rapid Transit Company, in carrying passengers between Minneapolis and St. Paul. The plan was to operate these buses over University Avenue and to carry local traffic.

The commission allows the Northland to begin on May 15 to run seventeen of its 27 long-distance buses from the Minneapolis terminal to St. Paul over the Franklin Avenue bridge route, but without a provision permitting the buses to take on or drop off passengers en route.

St. Paul had asked that long-distance buses from the north extend the route from the Minneapolis station to St. Paul. The company could come to no agreement with the Twin City company for carrying passengers between the two cities, so it made a move to run through and reimburse itself with carrying local traffic.

The decision is a distinct victory for the Twin City Rapid Transit Company, which now has a monopoly of the passenger business between the two cities by trolley car and bus. The commission said:

> This places the local transportation systems of these two cities and suburban points under one directing organization, which should lead to the greatest efficiency of operation and the minimum of cost and



Crippled Children at Toronto Ready to Be Transported

furnish adequate facilities to meet the increasing transit needs of these rapidly expanding communities.

The order to the Northland company authorizes it to extend its Taylors Falls service to Minneapolis from St. Paul.

Certificates of convenience and necessity were granted to the Twin City Motor Bus Company to operate buses (already in actual operation) between the Twin Cities over the Como Avenue, University Avenue and Lake Street routes and between Minneapolis and Glen Lake, with probable change of loop routes in both cities. Slight changes were made in the passenger rate on the latter line.

Commission Has Control of Colorado Buses

Bus lines carrying passengers, freight or express are common carriers under the public utilities act of Colorado and are subject to regulation by the Colorado Public Utilities Commission, according to a decision by the State Supreme Court in the case of the Greeley Transportation Company. Under the decision the commission has power to grant or deny permits to persons or companies for the operation of bus lines in the state and has power to formulate rules and regulations governing the operation of such lines.

Bus Program Put Through by New York Legislature

Practically the entire program advocated by the Public Service Commission and bus transportation interests was passed by the New York State Legislature, which adjourned on April 23. Included in its annual report was a recommendation of the Public Service Commission that bus lines be made common carriers and a separate article of the public service commission law added specifically regulating this branch of the transportation business. This was done under two bills introduced in the Senate by Warren T. Thayer, and now in the hands of the Governor.

Two bills in the hands of the Governor permit bus companies to hold stock in street railroad companies. Both amend the same section (section 54) and the Governor must take his choice as to which he will approve. The Sargent bill provides that such companies organized under the transportation corporations law may exercise such privilege. This bill passed both houses of the Legislature, went to the Governor, was recalled and after the passage of the Thayer bill was again returned to the executive chamber. The Thayer bill permits the exercise of such privilege by any bus corporation, however organized, subject either to the jurisdiction of the public service or transit commission.

In the closing hours of the session the Messer bill passed both houses of the Legislature. This measure permits the substitution, on approval of the Public Service Commission, of buses for cars or trains on tracks of railroad companies or street railways.

Another measure in the hands of the Governor will make it exceedingly difficult for a new bus company to engage in business in New York City. This is the Wales bill. It amends section 172 of the railroad law by providing, on application for consent of local authorities, written notice of filing such application shall be given to all common carriers operating through territory through which applicant proposes to operate.

Bus Service Planned.—The Key System Transit Company proposes as an improvement in transportation a bus line in Berkeley, Cal., to extend from Gilman Street to Berkeley Place, tapping a thickly settled, recently developed residential district of the city. At present this section has no means of transportation.

New Buses on Market Street Line.—The Public Service Railway, Newark, N. J., put into operation on April 21 on the Market Street line the first of the 333 gas-electric type buses. Three machines are in use for the late rush-hour service especially in Roseville Avenue. Others will be operated on the Bergan line serving Hackensack, Little Ferry, Ridgefield Park, Ridgefield, Fairview, North Bergen, Guttenberg, West New York and Weehawken. The buses operate every fifteen minutes with running time between terminals 55 minutes.

Service Extends to Abbotsford.—The British Columbia Rapid Transit Company, a subsidiary of the British Columbia Electric Railway, Vancouver, Canada, is now operating coaches to Abbotsford, and in the near future will be running through to Chilliwack. This can be done only when the new road across Sumas prarie is ready for traffic. The company has ordered two new coaches similar to those in use between Vancouver and New Westminster.

Proposal for Bus Service Expected.—A movement by the Syracuse & Eastern Railroad, Syracuse, N. Y., to supplant its electric railway lines with buses is seen in the announcement that the proposal to establish bus service between Syracuse and Fayetteville is to be taken up at the annual meeting of the company on May 14. The company has been operating buses from Syracuse to Salt Springs Road and Selley Road for two years.

Will Carry Merriment Seekers to Resort.—A bus service to Fountain Lake, a popular swimming resort northeast of Hot Springs, Ark., on the Little Rock highway, will be started on May 1 by the Hot Springs Street Railway. The buses will be operated throughout the summer and will run on a 45-minute schedule from 10 o'clock in the morning until 11 o'clock at night. A fare of 40 cents for the round trip will be charged; the one-way fare 25 cents.

Buses Will Replace Cars.—The Denver & South Platte Railway, operating between Englewood and Littleton, Colo., about 6 miles, has been authorized by the State Public Utilities Commission to abandon service effective on May 5, tear up its tracks, remove the wires and to substitute buses. The company's plea was based upon the fact that it was losing money. Those who opposed the elimination of the street cars failed to sustain their point. The commission said: "You have failed to support the cars sufficiently to enable the railway to carry on."

New Line Proposed.—The San Francisco, Napa & Calistoga Electric Railway, San Francisco, Cal., has applied to the State Railroad Commission to run buses between Calistoga and Vallejo in conjunction with its present train service. The railway plans to discontinue certain trains if permitted to operate the buses along the highway paralleling the railway.

Bus Service to Replace Stub Line.—Fred N. Carpenter, president of the Carpenter Rapid Transit Company, which operates buses for local service Tonawanda and North Tonawanda, has outlined to the Tonawanda Board of Aldermen plans for increasing the number of bus routes in the city as soon as the International Railway, Buffalo, abandons its Military Road and Kenmore-Tonawanda car lines. The Aldermen favor the Carpenter plan.

Seeks Fare Increase.—The Indiana Service Corporation of Fort Wayne, Ind., operating interurban and bus lines, recently asked the Indiana Public Service Commission for permission to increase fares to a basis of 3 cents a mile on three bus lines the company bought some time ago from private owners and to abandon another line. The line which the company seeks to abandon runs between Fort Wayne and Muncie. The three lines on which more fare is asked are from Fort Wayne to Peru, to Marion and to Auburn and Angola. Insufficient revenue is given as the cause for the rate boost request.

No Loss to Be Suffered by Bus Company.—The Joseph Darst Realty Company has guaranteed the St. Louis Bus Company, subsidiary of the United Railways, St. Louis, Mo., against loss on the new feeder line into the Delmar-Olive division of the railway from the Olive Street Road from as far west as the Woodson Road. Dartsdale, a subdivision on the Olive Street road, was opened several months ago by the Joseph Darst Realty Company, progressive real estate operator. It tried the experiment of operating independently owned buses to its subdivision property, but the results were unsatisfactory. It then decided to present the problem to the St. Louis Bus Company, and the result was this unusual departure in co-ordinated bus and railway service.

Would Compete with Railway.—Application for a 50-year franchise to operate a passenger bus service in the city of South Bend, Wash., has been presented to the City Council by Oscar Oman of the Ocean Beach Transportation Company. The act follows the announcement of the Willapa Electric Company that it had applied to the Department of Public Works to abandon its present railway line in and between the cities of South Bend and Raymond and to substitute bus service. In order to protect the railway ordinances were passed years ago forbidding the operation of buses in the city. At one time the Eager and the Oman company, predecessors of the present Ocean Beach Transportation Company, which operates the stage line through several beach towns, planned to petition for a permit to extend their lines through to Raymond, but were blocked by the railway. The present application will be heard on May 3.

Financial and Corporate

Dividend Passed

Texas Electric Railway to Apply Deferred Dividends on First and Second Preferred to Improvements

For the first time since the formation of the Texas Electric Railway in 1917 payments of dividends on the first and the second preferred stock will be deferred. This decision was reached at a meeting of the board of directors on April 23 after a careful study of estimates of the company's financial position in the years immediately in the future. The drought last year was so severe that not more than half of the normal crop of cotton was produced in the territory served by this railway. Some sections produced only a third of the normal crop, while a few sections in the northern part of the state were not so seriously affected. There is no other one product that affects business in this locality so seriously as cotton and many other utilities operating in this district suffered losses in gross revenue from the same condition.

PROPERTY MUST BE KEPT UP

The board of directors was unwilling to sacrifice the maintenance or improvement of the property to pay dividends, as it is the belief that only by rendering a superior service can the road be in position to compete successfully with the state and county highways and the ever-increasing competition upon them caused by the private automobiles. The directors and management have undertaken to effect economies of operation other than curtailment of maintenance and the betterments planned for the immediate future which will tend to induce new business. Plans for inducing increased riding are already under way, and new plans are being developed that will be announced shortly.

Jack Beall, president of the Texas Electric Railway, made the following statement about the matter to the representative of the ELECTRIC RAILWAY JOURNAL in Dallas:

Unfortunate as it is to defer payment of dividends on the preferred stocks, it nevertheless seems advisable at this juncture. Reduced revenues caused by the drought of last year will probably continue until money is again available from the profits of this year's crop of grain and cotton. The excellent weather at the present time has heartened the farmers and they are now planting cotton on extensive acreage.

The property has always been maintained in excellent operating condition and the company has been engaged in extensive betterments, including additional ballast and the rebuilding of wood bridges and trestles with steel and concrete structures. On the 100-mile line between Dallas and Waco the 6,500 ft. of wood bridges existing in 1920 have been reduced to 500 ft. In other words, 6,000 ft. of bridges have been rebuilt with steel or concrete structures and creosoted pine.

The directors are unwilling to curtail the budget expenditures planned for this year and desire even to improve maintenance, in the belief that a superior service will attract additional business. The management is charged with the task of making certain curtailments in operating expenses and of making additional efforts to obtain new business. In common with other railway operations the Texas Electric has suffered from private automobile competition and to some extent from bus competition, although indirectly, since there is no paralleling operations on the property except for 32 miles between McKinney and Dallas.

It is the belief, in short, that this plan will prove to be the best in the long run and that future net earnings will allow the reestablishment of the preferred stocks on the dividend basis. The improvement in physical property is expected to reduce operating expenses and better the service. More extensive advertising should improve the gross revenue.

A digest of the report of the company for 1925 was published in the JOURNAL for March 27, page 568.

Slight Gain in Net in Minneapolis

The first full quarter report since the Minneapolis Street Railway, Minneapolis, Minn., has operated under the advanced fare of 8 cents cash and six tokens for 40 cents permitted by the Minnesota Railroad and Warehouse Commission, instead of 6 cents flat, shows net of $291,250. This is a gain of $3,929 over the first quarter of 1925. Compared with the net for 1924, when the figure for the first quarter was $246,187, the gain is $45,063. Operating revenue gain of $88,189 for the quarter this year was offset by an increase of $78,116 in operating expenses over 1925. The operating revenues respectively were $2,133,857 and $2,045,668 and expenses $1,416,622 and $1,338,506. Tax levies reduced the income by $208,423 to $508,812. Interest and miscellaneous charges were $231,997. The income from rentals and non-operating sources was $14,325.

Net Income for 1925 Shows Improvement

Details of Operation from Railways Representing 90 per Cent of Earning Capacity of Industry—Slight Decrease in Traffic Offset by Lower Operating Costs and Increased Efficiency—Operating Ratio Slightly Lower than in 1924

IMPROVEMENT was shown in the financial condition of the electric railways as a whole in 1925 compared with 1924. There was a small decrease in the volume of traffic handled and in consequence a corresponding decrease in the gross revenues, but lower operating costs offset these adverse factors and produced an increase in the net revenue in the larger cities. The interurbans and smaller companies are still reporting unfavorable results. While the gains that have been made by the industry as a whole are encouraging, conditions are still far from satisfactory.

His summary of the net results of operations in 1925 is based on the reports of a group of companies representing approximately 90 per cent of the earning power of the industry. Altogether 327 companies reported and the accompanying tables give briefly the most significant facts in connection with their operations.

COMBINED OPERATIONS OF 327 COMPANIES

	1925	1924	Increase or (D) Decrease	Per Cent Increase or (D) Decrease
Railway operating revenue	$832,506,416	$835,085,489	(D) $2,579,073	(D) 0.31
Railway operating expense	610,752,671	617,065,623	(D) 6,312,952	(D) 1.02
Net operating revenue	$221,753,745	$218,019,866	$3,733,879	1.71
Operating ratio, per cent	73.36	73.89	(D) 0.53	(D) 0.72
Miles of track	31,189.59	31,284.96	(D) 95.37	(D) 0.31
Revenue passengers	11,569,799,316	11,705,440,140	(D) 135,640,824	(D) 1.16
Total passengers	14,511,690,825	14,627,347,649	(D) 115,656,824	(D) 0.80
Car-miles, revenue	1,971,496,333	1,962,126,053	(D) 9,370,250	0.48

The reduction in operating expenses was brought about by lower material costs and by more efficient operation, particularly in the use of labor. The cost of labor continued comparatively stable, the average wages at the end of the year being only slightly more than 1 per cent above the average at the end of 1924. The slight decrease in traffic was caused by the continued increase in the use of the private automobile and by subnormal industrial conditions in certain sections of the country, particularly in New England and the northwestern states.

So writes Edmund J. Murphy, chief statistician of the American Electric Railway Association, in *Aera* for May.

The total number of passengers carried by this group of companies in 1925 was 14,511,690,825, a decrease of 0.80 per cent compared with 1924. Of these 11,569,799,316 were revenue passengers, a decrease of 1.16 per cent from 1924.

The total railway operating revenue of these companies in 1925 was $832,506,416, a decrease of $2,579,073, or 0.31 per cent. The operating expenses, however, decreased $6,312,952, or 1.02 per cent. This more than offset the loss in revenue. There was an increase of $3,733,879, or 1.71 per cent, therefore, in the net revenue from operations. The actual amount in 1925 was $221,753,745, compared with $218,019,866 in 1924. The operating ratio of the group dropped from 73.89 per cent to 73.36 per cent.

It will be noted that the decrease in operating revenue compared with 1924 was considerably less than the decrease in revenue passengers. The respective

amounts were 0.31 per cent and 1.16 per cent. This difference is due to a slightly higher average rate of fare in 1925. When total passengers are considered, however, the effect of the higher fare is offset to some extent by the increase in the number of transfer passengers.

Bus Operations

These figures include for the most part only railway operations. There were, however, 30 companies that included bus operations in their reports. These operations, therefore, are included in the above table. They are so insignificant in comparison with the totals for the railways, however, that their effect is practically negligible.

In order to picture the total operations of all kinds of electric railways the accompanying table was prepared in which the bus operations of 66 companies controlled or operated by electric railways have been added to the railway operations. This table then includes 327 railway companies and 96 bus undertakings controlled by electric railways.

COMBINED OPERATIONS OF 327 RAILWAY COMPANIES AND 96 CONTROLLED BUS UNDERTAKINGS

	1925	†924	Increase or (D) Decrease	Per Cent Increase or (D) Decrease
Operating revenue	$840,395,490	$838,904,506	$1,490,984	0.18
Operating expense	618,757,782	620,743,272	(D) 1,985,490	(D) 0.32
Net operating revenue	$221,637,708	$218,161,234	$3,476,474	1.59
Operating ratio, per cent	73.63	73.99	(D) 0.36	(D) 0.49
Revenue passengers	11,632,868,986	11,734,410,535	(D) 101,541,549	(D) 0.87
Total passengers	14,583,367,813	14,660,991,440	77,623,627	(D) 0.53
Car- and bus-milea, revenue	2,003,400,393	1,977,825,691	25,574,702	1.29

With the bus figures added the gross revenues are increased and net revenues decreased. Some of the bus lines were not in operation in 1924, and many of those that were added new lines during the year and put on additional buses. All of this added substantially to the passenger traffic and the gross revenues. On the other hand nearly all of the bus lines are operating at a loss and when they are averaged in with the railways the effect is to increase expenses and raise the operating ratio of the group. Their total effect on the railway figures, however, is less than one-half of 1 per cent. In spite of the fact that bus operations are increasing by leaps and bounds, they only reduce the decrease in passenger traffic from 0.80 per cent for the railways alone to 0.53 per cent for the combined group.

In the scheme of analysis the whole group of 221 companies is first considered. The group of companies is then classified into city companies, interurban companies and combination companies operating both city and interurban lines.

Finally each of the three classes of companies is further subdivided into three smaller groups according to the sizes of the companies as follows: "A" companies, having gross railway revenues of $1,000,000 or more per year; "B" companies, having annual revenues of from $250,000 to $1,000,000, and "C" companies, having annual revenues of less than $250,000.

The operations of the combined group of 221 companies follow very closely those of the larger group of 327 companies. The differences are in favor of the larger group, due to the inclusion of several metropolitan companies omitted in the smaller group. Thus revenue and total passengers decreased 2.87 per cent and 2.33 per cent respectively for this group of 221 companies and operating revenues were down 1.15 per cent. The effect of a higher average fare and a more liberal use of transfers is noticeable in these figures as they were in the figures of the 327 company group.

Something of an offset to these unfavorable comparisons is furnished by the operating expenses of the smaller group, which were 1.62 per cent lower, a substantially greater decrease than that recorded by the larger group. The operating ratio, however, is somewhat higher, although it dropped from 75.13 in 1924 to 74.78 in 1925. Net revenue was up 0.25 per cent.

Taxes as usual increased, the amount being $242,244, or 0.69 per cent. This was offset by an increase of $359,764 in the net revenue from auxiliary operations, the increase amounting to 10.05 per cent over 1924. An increase of $918,158, or 11.08 per cent, in non-operating income helped at this point and produced a gross income of $116,090,794, compared with $114,602,722 in 1924, an increase of $1,488,072, or 1.30 per cent. Deductions from income or fixed charges were $95,034,960, a decrease of $937,079 from 1924, or 0.98 per cent. Net corporate income was $21,055,834, compared with a net income of $18,630,683 in 1924. The increase was $2,425,151, or 13.02 per cent.

The average cost of operation per car-mile of this group of companies was 33.50 cents in 1925, compared with 33.79 cents in 1924. The decrease can be traced to the power and maintenance

Statistics Compiled by American Electric Railway Association

Part I—Combined Operating Reports of 221 Electric Railways for the Calendar Year 1925 Compared with 1924

TABLE I—COMBINED INCOME STATEMENT

	1925	1924	Increase or Decrease (D) Total	Increase or Decrease (D) Per Cent	Cents per Car-Mile 1925	Cents per Car-Mile 1924	Cents per Car-Mile Per Cent Increase
Railway operating revenue	$546,259,829	$552,622,641	(D) $6,362,812	(D) 1.15	44.80	44.98	(D) 0.40
Railway operating expense	408,485,147	415,187,030	(D) 6,701,883	(D) 1.62	33.50	33.79	(D) 0.86
Net operating revenue	$137,774,682	$137,435,611	339,071	0.25	11.30	11.19	0.98
Net revenue: Auxiliary operations	3,937,800	3,578,036	359,764	10.05	0.32	0.29	10.34
Taxes	34,997,018	34,754,774	242,244	0.69	2.87	2.83	1.41
Operating income	$106,715,464	$106,258,873	456,591	0.43	8.75	8.64	1.27
Non-operating income	9,203,127	8,284,969	918,158	11.08	0.75	0.67	11.94
Gross income	a $116,090,794	b $114,602,722	1,488,072	1.30	9.52	9.33	2.04
Deductions from gross income	95,034,960	95,972,038	(D) 937,079	(D) 0.98	7.79	7.81	(D) 0.26
Net income	$21,055,834	$18,630,683	$2,425,151	13.02	1.72	1.52	13.15
Operating ratio (per cent)	74.78	75.13	(D) 0.35	(D) 0.47	....	....	.....
Ratio: Net income to operating revenue	3.85	3.37	0.48	14.24	....	....	.....

a Includes $172,203 equalization income. b Includes $58,880 equalization income.

TABLE II—OPERATING EXPENSES BY PRIMARY ACCOUNTS

	1925	1924	Increase or Decrease (D) Total	Increase or Decrease (D) Per Cent	Cents per Car-Mile 1925	Cents per Car-Mile 1924	Cents per Car-Mile Per Cent Increase
Way and structures	$60,833,182	$61,246,911	(D) $412,729	(D) 0.68	4.98	4.98	.....
Equipment	52,375,494	54,799,849	(D) 2,424,355	(D) 4.43	4.29	4.46	(D) 3.81
Power	56,022,802	59,212,509	(D) 3,189,707	(D) 5.39	4.59	4.82	(D) 4.77
Conducting transportation	176,451,629	178,656,502	(D) 2,204,873	(D) 1.24	14.47	14.54	(D) 0.48
Traffic	2,144,047	1,756,542	387,505	22.06	0.17	0.14	21.43
General and miscellaneous	57,796,246	57,040,465	785,781	1.32	4.74	4.64	2.15
Transportation for inveatment—Cr.	—387,460	—340,982	46,478	13.63	0.03	0.02	50.00
Total operating expenses	a $408,485,147	b $415,187,030	(D) $6,701,883	(D) 1.62	c 33.50	d 33.79	(D) 0.76

a Includes $3,249,207 undistributed expense. c Includes 0.27 cent of undistributed expense.
b Includes $2,815,234 undistributed expense. d Includes 0.22 cent of undistributed expense.

of equipment accounts and, to a lesser degree, to the conducting transportation account. This latter account came to 14.47 cents per car-mile in 1925, compared with 14.54 cents in 1924. There was no decrease in wages in 1925; the average wage was in fact somewhat more than 1 per cent higher than in 1924. The decrease in the cost per car-mile, therefore, must be credited to a more efficient use of man-hours, and it is a very encouraging sign of progress.

Another indication that the companies are more alert and efficient in the management of their properties is found in the reduction in the number of car-miles run to conform with the reduced traffic.

Total revenue car-miles were reduced only 9,395,707. This indicates an increase in the mileage run in other than passenger service. This is undoubtedly due to the increased freight service which electric railways are known to be developing. The increase in non-passenger mileage is confined almost entirely to the interurban and combination city and interurban lines, with the straight interurban lines furnishing the greater part of it.

Classes of Companies Compared

When the group of companies is separated into its three classes it is found that all of the favorable factors were furnished by the city companies. The combination companies might be said to have about held their ground but the interurbans had to give way somewhat. The number of revenue passengers, for instance, decreased 2.55 per cent on the city lines, 3.81 per cent on the combination lines and 8.63 per cent on the interurban lines. Again, the operating revenue actually increased 0.22 per cent on the city lines, it decreased 3.96 per cent on the combination lines and it decreased 5.13 per cent on the interurbans. There is evidence, however, that the interurbans increased their freight revenue. Thus, while their passenger revenue decreased 7.98 per cent, their total operating revenue decreased only 5.13 per cent. This is also true of the combination lines. Their total revenues decreased only 3.96 per cent, while their passenger revenue alone was decreasing 4.98 per cent.

In the reduction of operating expenses, too, the interurbans made the best showing. They reduced their cost per car-mile 2.69 per cent, compared with a reduction of 0.72 per cent for the city lines and 0.83 per cent for the combination lines. The greatest reduction was effected by the interurbans in the maintenance of equipment account, 6.94 per cent, while the city companies made their greatest reduction in their power cost, 5.53 per cent. The combination companies effected the greatest reduction of expenses in their maintenance of way and structures, 3.05 per cent per car-mile, as against 2.71 per cent in their power. The interurbans also reduced their maintenance of way expense per car-mile 4.42 per cent, their power cost 6.70 per cent and their conducting transportation expense 0.08 per cent. The combination companies reduced their maintenance of equipment cost 1.17 per cent and their conducting transportation cost 2.66 per cent per car-mile. It is interesting to note in this connection that the only expense other than power that the city companies reduced was their maintenance of equipment, which decreased 4.45 per cent per car-mile. Their cost of conducting transportation increased 0.20 per cent and their maintenance of way 2.19 per cent per car-mile. Of still greater interest, perhaps, is the general increase in the amounts spent for the promotion of traffic by all types of com-

TABLE III—OPERATING STATISTICS—221 COMPANIES

	1925	1924	Increase or Decrease (D) Total	Per Cent
Passenger car-miles	1,182,404,436	1,193,154,462	(D) 10,750,026	(D) 0.91
Total revenue car-miles	1,219,236,302	1,228,632,009	(D) 9,395,707	(D) 0.77
Revenue passengers[1]	6,953,544,580	7,158,932,196	(D) 205,387,616	(D) 2.87
Transfer passengers[2]	1,726,122,971	1,723,682,296	2,440,675	0.14
Total passengers[1]	8,749,708,711	8,958,005,506	(D) 208,296,795	(D) 2.33
Passenger revenue	$508,882,806	$516,068,823	(D) $7,186,017	(D) 1.39
Revenue car-hours[3]	110,713,726	111,799,884	(D) 1,086,158	(D) 0.97
Passenger car-hours[3]	109,536,800	110,626,930	(D) 1,090,130	(D) 0.99
Miles of single track	23,484.91	23,576.23	(D) 91.32	(D) 0.39
Passenger cars operated[4] *a*	26,816	26,815		

a Average maximum number of passenger cars in service daily.
[1] Reported by 218 companies.
[2] Reported by 150 companies.
[3] Reported by 189 companies.
[4] Reported by 176 companies.

TABLE IV—SIGNIFICANT RATIOS DERIVED FROM THE FOREGOING TABLES—221 COMPANIES

	1925	1924	Per Cent Increase or (D) Decrease
Railway operating revenue	$546,259,829	$552,622,641	(D) 1.15
Per mile of single track	23,260	23,440	(D) 0.77
Gross income	$116,090,794	$114,602,722	1.30
Per mile of single track	$4,941	$4,861	1.65
Passenger revenue	$508,882,806	$516,068,823	(D) 1.39
Per revenue passenger	[1]7.1c.	[1]7.0c.	1.43
Per total passenger	[1]5.7c.	[1]5.7c.	
Per mile of single track	$21,668	$21,889	(D) 1.01
Per passenger car-mile	43.0c.	43.3c.	(D) 0.69
Per car operated	[2]$16,302	[2]$16,542	(D) 1.45
Per passenger car-hour	[3]$4.07	[3]$4.08	(D) 0.25
Revenue passengers	[1]6,953,544,580	[1]7,158,932,196	(D) 2.87
Per mile of single track	[1]307.463	[1]315,451	(D) 2.53
Per passenger car-mile	[1]6.0	[1]6.1	(D) 1.64
Per car operated	[4]226,859	[4]234,314	(D) 3.18
Per passenger car-hour	[5]59	[5]60	(D) 1.67
Total passengers	[1]8,749,708,711	[1]8,958,005,506	(D) 2.33
Per mile of single track	[1]386,884	[1]394,725	(D) 1.99
Per passenger car-mile	[1]7.6	[1]7.7	(D) 1.30
Ratio: Transfer passengers to revenue passengers (per cent)	24.8%	24.1%	2.90
Revenue car-miles	1,219,236,302	1,228,632,009	(D) 0.76
Per mile of single track	51,915	52,315	(D) 0.76
Per car operated	[2]38,914	[2]39,390	(D) 1.21
Per car-hour	[3]9.31	[3]9.29	0.22
Car-hours	[3]110,713,726	[3]111,799,884	(D) 0.97
Per car operated	[6]4,090	[6]4,145	(D) 1.33

[1] 218 companies. [2] 176 companies. [3] 189 companies. [4] 174 companies. [5] 186 companies. [6] 158 companies.

Part II—City Lines—Combined Reports of 96 Companies Operating City Lines Exclusively

TABLE V—COMBINED INCOME STATEMENT

	1925	1924	Increase or (D) Decrease	Per Cent Increase or (D) Decrease
Railway operating revenue	$378,513,379	$377,665,237	$848,142	0.22
Railway operating expense	277,743,129	280,246,398	(D) 2,503,269	(D) 0.89
Net operating revenue	$100,770,250	$97,418,839	$3,351,411	3.44
Net revenue: Auxiliary operations	662,528	668,527	(D) 5,999	(D) 0.90
Taxes	24,672,566	24,243,958	428,608	1.76
Operating income	$76,760,212	$73,843,408	$2,916,804	3.95
Non-operating income	5,212,242	4,605,458	606,784	13.17
Gross income	*a*$82,144,657	*b*$78,507,746	$3,636,911	4.63
Deductions from gross income	63,751,223	62,685,675	1,065,548	1.70
Net income	$18,393,434	$15,822,071	$2,571,363	16.25
Operating ratio, per cent	73.38	74.20	(D) 0.82	(D) 1.11
Ratio: Net income to operating revenue	4.86	4.18	0.68	16.26

a Includes $172,203 equalization income.
b Includes $58,880 equalization income.

TABLE VI—OPERATING EXPENSES BY PRIMARY ACCOUNTS

	1925	1924	Increase or (D) Decrease	Per Cent Increase or (D) Decrease
Way and structures	$38,990,710	$38,212,613	$778,097	2.04
Equipment	35,969,086	37,719,579	(D) 1,750,493	(D) 4.64
Power	35,803,713	37,850,683	(D) 2,046,970	(D) 5.41
Conducting transportation	127,595,136	127,587,195	7,941	0.01
Traffic	799,015	629,635	169,380	26.90
General and miscellaneous	36,533,840	36,126,295	407,545	1.13
Transportation for investment—Cr.	—116,607	—131,339	(D) 14,732	(D) 11.22
Total operating expense	*a*$277,743,129	*b*$280,246,398	(D) $2,503,269	(D) 0.89

a Includes $2,168,236 undistributed expense.
b Includes $2,251,737 undistributed expense.

TABLE VII—OPERATING STATISTICS

	1925	1924	Increase or (D) Decrease	Per Cent Increase or (D) Decrease
Passenger car-miles	832,545,696	834,024,876	(D) 1,479,180	(D) 0.18
Total revenue car-miles	836,591,328	838,047,485	(D) 1,456,157	(D) 0.17
Revenue passengers	5,424,784,581	5,566,644,528	(D) 141,859,947	(D) 2.55
Transfer passengers[1]	1,577,724,303	1,563,418,639	14,305,664	0.91
Total passengers	7,041,296,156	7,170,501,884	(D) 129,205,728	(D) 1.80
Passenger revenue	$369,248,085	$368,618,666	$629,419	0.17
Revenue car-hours[2]	81,572,794	81,794,120	(D) 221,326	(D) 0.27
Passenger car-hours[2]	81,369,105	81,580,791	(D) 211,686	(D) 0.26
Miles of single track	10,508.29	10,536.41	(D) 28.12	(D) 0.27
Passenger cars operated[3] *a*	20,024	19,883	141	0.71

a Average maximum number of passenger cars in service daily. [1] Reported by 79 companies. [2] Reported by 87 companies. [3] Reported by 83 companies.

panies. The total amount spent by the three groups was $2,144,047, an increase of $387,505 over 1924. The increase for the city companies was 26.90 per cent, for the interurbans 19.40 per cent and for the combination companies 19.34 per cent. This would seem to indicate that all companies were paying more attention to advertising and the development of new business generally.

In spite of the very substantial reduction in the operating expenses of the interurban companies the operating ratio of the group rose from 83.75 to 84.61 per cent. This, of course, was due to the decrease in traffic and revenue which was greater than the decrease in expenses. The city lines having both an increase in revenue and a decrease in expenses, their operating ratio dropped from 74.20 to 73.38 per cent, the lowest ratio of the three groups. The change in the combination lines was, as it naturally would be, midway between the other two, their operating ratio rising slightly from 76.08 per cent to 76.90 per cent.

Taxes on City Lines Increased

The taxes of the city lines increased 1.76 per cent, but those of the two other groups declined, 6.50 per cent in the case of the interurbans and 1.14 per cent in the case of the combination companies.

Fixed charges followed the same course among the groups. There was in increase of 1.70 per cent for the city companies and decreases of 1.14 per cent and 7 per cent respectively for the interurban and combination companies.

These minor advantages of these two groups did not, however, begin to equal the initial advantage in the net results from operations enjoyed by the city lines. Consequently while the net income of the city lines registered a substantial increase, that of the two other groups fell off slightly. The net corporate income of the city lines amounted to $18,393,434, an increase of $2,571,363, or 16.25 per cent, over 1924.

The interurban lines closed the year with a deficit of $1,270,856, which was an increase of $126,702 compared with 1924. The net income of the combination lines amounted to $3,933,256, a decrease of $19,510, or 0.49 per cent, under 1924.

It is of more than passing interest to note in connection with the above figures that the interurban group was the only one of the three to show an increase in track mileage. The increase was only 10.58 miles, but it compares

Part III—Interurban Lines—Combined Reports of 49 Companies Operating Interurban Lines Exclusively

TABLE VIII—INCOME STATEMENT OF 49 ELECTRIC RAILWAYS

	1925	1924	Increase or (D) Decrease	Per Cent Increase or (D) Decrease
Railway operating revenue	$22,669,875	$23,896,461	(D) $1,226,586	(D) 5.13
Railway operating expense	19,181,568	20,013,193	(D) 831,625	(D) 4.16
Net operating revenue	$3,488,307	$3,883,268	(D) $394,961	(D) 10.17
Net revenue: Auxiliary operations	1,568,608	1,401,166	167,442	11.95
Taxes	1,171,137	1,252,498	(D) 81,361	(D) 6.50
Operating income	$3,885,778	$4,031,936	(D) $146,158	(D) 3.63
Non-operating income	349,530	393,364	(D) 43,834	(D) 11.14
Gross income	$4,235,308	$4,425,300	(D) $189,992	(D) 4.29
Deductions from gross income	5,506,164	5,569,454	(D) 63,290	(D) 1.14
Net income	*$1,270,856	*$1,144,154	*$126,702	.....
Operating ratio, per cent	84.61	83.75	0.86	1.03
Ratio: Net income to operating revenue	.....	.....	.....	.....

*Deficit.

TABLE IX—OPERATING EXPENSES BY PRIMARY ACCOUNTS

	1925	1924	Increase or (D) Decrease	Per Cent Increase or (D) Decrease
Way and structures	$3,716,154	$3,949,402	(D) $233,248	(D) 5.91
Equipment	2,309,722	2,516,528	(D) 206,806	(D) 8.22
Power	3,392,689	3,690,545	(D) 297,856	(D) 8.07
Conducting transportation	5,986,621	6,083,884	(D) 97,263	(D) 1.60
Traffic	351,748	294,580	57,168	19.40
General and miscellaneous	3,437,820	3,485,661	(D) 47,841	(D) 1.37
Transportation for investment—Cr	—14,273	—10,191	4,082	40.05
Total operating expense	a$19,181,568	b$20,013,193	(D) $831,625	(D) 4.16

a Includes $1,087 undistributed expense.
b Includes $2,784 undistributed expense.

TABLE X—OPERATING STATISTICS

	1925	1924	Increase or (D) Decrease	Per Cent Increase or (D) Decrease
Passenger car-miles	38,010,213	39,494,142	(D) 1,483,929	(D) 3.76
Total revenue car-miles	47,762,458	48,490,250	(D) 727,792	(D) 1.50
Revenue passengers[1]	54,653,444	59,815,956	(D) 5,162,512	(D) 8.63
Transfer passengers[2]	1,086,556	1,150,161	(D) 63,605	(D) 5.53
Total passengers[1]	57,385,061	62,586,043	(D) 5,200,982	(D) 8.31
Passenger revenue	$14,305,650	$15,545,349	(D) $1,239,699	(D) 7.98
Revenue car-hours[3]	1,768,776	1,824,661	(D) 55,885	(D) 3.06
Passenger car-hours[3]	1,400,904	1,469,075	(D) 68,171	(D) 4.64
Miles of single track	3,027.87	3,017.29	10.58	0.35
Passenger cars operated[4] a	473	468	5	1.06

a Average maximum number of passenger cars in service daily. [1] Reported by 48 companies. [2] Reported by 12 companies. [3] Reported by 35 companies. [4] Reported by 36 companies.

Part IV—City and Interurban Lines—Combined Reports of 76 Companies Operating Combined City and Interurban Lines

TABLE XI—INCOME STATEMENT

	1925	1924	Increase or (D) Decrease	Per Cent Increase or (D) Decrease
Railway operating revenue	$145,076,575	$151,060,943	(D) $5,984,368	(D) 3.96
Railway operating expense	111,560,450	114,927,439	(D) 3,366,989	(D) 2.93
Net operating revenue	$33,516,125	$36,133,504	(D) $2,617,379	(D) 7.24
Net revenue: Auxiliary operations	1,706,664	1,508,343	198,321	13.15
Taxes	9,153,315	9,258,318	(D) 105,003	(D) 1.14
Operating income	$26,069,474	$28,383,529	(D) $2,314,055	(D) 8.15
Non-operating income	3,641,355	3,286,147	355,208	10.81
Gross income	$29,710,829	$31,669,676	(D) $1,958,847	(D) 6.19
Deductions from gross income	25,777,573	27,716,910	(D) 1,939,337	(D) 7.00
Net income	$3,933,256	$3,952,766	(D) $19,510	(D) 0.49
Operating ratio, per cent	76.90	76.08	0.82	1.08
Ratio: Net income to operating revenue	2.71	2.62	0.09	3.43

TABLE XII—OPERATING EXPENSES BY PRIMARY ACCOUNTS

	1925	1924	Increase or (D) Decrease	Per Cent Increase or (D) Decrease
Way and structures	$18,126,318	$19,084,896	(D) $958,578	(D) 5.02
Equipment	14,096,686	14,563,742	(D) 467,056	(D) 3.21
Power	16,826,400	17,671,281	(D) 844,881	(D) 4.78
Conducting transportation	42,869,872	44,985,423	(D) 2,115,551	(D) 4.70
Traffic	993,284	832,327	160,957	19.34
General and miscellaneous	17,824,586	17,428,509	396,077	2.27
Transportation for investment—Cr	—256,580	—199,452	57,128	28.64
Total operating expense	a$111,560,450	b$114,927,439	(D) $3,366,989	(D) 2.93

a Includes $1,079,884 undistributed expense.
b Includes $560,713 undistributed expense.

TABLE XIII—OPERATING STATISTICS

	1925	1924	Increase or (D) Decrease	Per Cent Increase or (D) Decrease
Passenger car-miles	311,848,527	319,635,444	(D) 7,786,917	(D) 2.44
Total revenue car-miles	334,882,516	342,094,274	(D) 7,211,758	(D) 2.11
Revenue passengers[1]	1,474,106,555	1,532,471,712	(D) 58,365,157	(D) 3.81
Transfer passengers[2]	147,312,112	159,113,496	(D) 11,801,384	(D) 7.42
Total passengers[1]	1,651,027,494	1,724,917,579	(D) 73,890,085	(D) 4.28
Passenger revenue	$125,329,071	$131,904,808	(D) 6,575,737	(D) 4.98
Revenue car-hours[3]	27,372,156	28,181,103	(D) 808,947	(D) 2.87
Passenger car-hours[3]	26,766,791	27,577,064	(D) 810,273	(D) 2.94
Miles of single track	9,948.75	10,022.53	(D) 73.78	(D) 0.74
Passenger cars operated[4] a	6,319	6,464	(D) 145	(D) 2.24

a Average maximum number of passenger cars in service daily. [1] Reported by 74 companies. [2] Reported by 59 companies. [3] Reported by 67 companies. [4] Reported by 57 companies.

Part V—Combined Statements of All Three Types of Companies on a Car-Mile Basis

TABLE XIV—INCOME STATEMENT OF 96 CITY COMPANIES, 49 INTERURBAN COMPANIES AND 76 COMPANIES OPERATING COMBINED CITY AND INTERURBAN LINES

	City Lines			Interurban Lines			City and Interurban Lines		
	Cents per Car-Mile		Per Cent Increase or (D)	Cents per Car-Mile		Per Cent Increase or (D)	Cents per Car-Mile		Per Cent Increase or (D)
	1925	1924	Decrease	1925	1924	Decrease	1925	1924	Decrease
Railway operating revenue..	45.24	45.06	0.39	47.46	49.28	(D)3.70	43.32	44.16	(D)1.91
Railway operating expense...	33.20	33.44	(D)0.72	40.16	41.27	(D)2.69	33.31	33.50	(D)0.84
Net operating revenue....	12.04	11.62	3.61	7.30	8.01	(D)8.86	10.01	10.56	(D)5.21
Net revenue: Auxiliary operations	0.08	0.08	.....	3.28	2.88	13.89	0.51	0.44	15.90
Taxes	2.93	2.89	1.38	2.45	2.58	(D)5.04	2.73	2.71	0.74
Operating income	9.17	8.81	4.08	8.13	8.31	(D)2.17	7.78	8.30	(D)6.27
Non-operating income	0.62	0.55	12.72	0.73	0.81	(D)9.88	1.00	0.96	13.54
Gross income	9.89	9.37	5.55	8.86	9.13	(D)2.96	8.87	9.26	(D)4.21
Deductions from gross income	7.62	7.49	1.73	11.53	11.48	0.43	7.69	8.10	(D)5.07
Net income	2.20	1.89	16.40	*2.66	*2.36	.....	1.17	1.15	1.73

TABLE XV—OPERATING EXPENSES OF 96 CITY COMPANIES, 49 INTERURBAN COMPANIES AND 76 COMPANIES OPERATING COMBINED CITY AND INTERURBAN LINES

	City Lines			Interurban Lines			City and Interurban Lines		
	Cents per Car-Mile		Per Cent Increase or (D)	Cents per Car-Mile		Per Cent Increase or (D)	Cents per Car-Mile		Per Cent Increase or (D)
	1925	1924	Decrease	1925	1924	Decrease	1925	1924	Decrease
Way and structures	4.66	4.56	2.19	7.78	8.14	(D) 4.42	5.41	5.58	(D)3.05
Equipment	4.30	4.50	(D)4.45	4.83	5.19	(D) 6.94	4.21	4.26	(D)1.17
Power	4.27	4.52	(D)5.53	7.10	7.61	(D) 6.70	5.02	5.16	(D)2.71
Conducting transportation	15.25	15.22	0.20	12.53	12.54	(D) 0.08	12.80	13.15	(D)2.66
Traffic	0.09	0.08	12.50	0.74	0.61	21.31	0.29	0.24	20.83
General and miscellaneous	4.36	4.31	1.16	7.19	7.19	.....	5.32	5.09	4.52
Transportation for Invest.—Cr.	0.01	0.01	.....	0.03	0.02	50.00	0.08	0.06	33.33
*Total operating expenses.	33.20	33.44	(D)0.72	40.16	41.27	(D)2.69	33.31	33.59	(D)0.83
*Undistributed expenses included in total	0.26	0.27	.....	.....	.....	.....	0.32	0.16	.....

*Deficit.

with a decrease of 28.12 miles for the city lines and 73.78 miles for the combination group.

Further Analysis

The most striking point that is brought out where the groups of companies are further subdivided according to the sizes of the companies is that the medium-sized city companies, those earning from $250,000 to $1,000,000 a year, made the greatest improvement in 1925. They changed a deficit of $416,505 in 1924 into a net corporate income of $519,070, a net change of $935,575. Their operating ratio was reduced from 82.33 per cent to 79.15 per cent. The sources of this improvement are found principally in a substantial reduction in operating expenses and in a really remarkable reduction of 21.01 per cent in their fixed charges. They saved a total of $451,403 by this reduction, which would indicate that they had made radical and successful changes in their financial structures. They also increased their track mileage by 13.72 miles.

The large city companies are of course in the strongest position. They reduced their operating ratio from 73.81 per cent to 73.07 per cent and increased their net corporate income by $1,679,682, or 10.27 per cent.

Status of Small City Companies Unchanged

The city companies earning less than $250,000 a year did not change their condition materially during the year. They had a deficit of $117,320 in 1924. This increased to $161,214 in 1925. Their operating ratio remained unchanged at 86.23 per cent in both years.

In the interurban group the large companies reduced their operating ratio from 83.76 to 83.57 and a deficit of $56,826 in 1924 to one of $2,812 in 1925. The medium and small sized companies, however, failed to show any improvement. Both these groups returned increased deficits and higher operating ratios. Loss of traffic was the source of their troubles.

Pretty much the same conditions prevailed among the combination companies. The large companies in this group earned a net income of $5,606,933, a decrease of $159,967, or 2.77 per cent. The operating ratio rose from 74.72 per cent to 75.65 per cent. The small companies reported an increased deficit and a higher operating ratio, but the medium-sized companies reduced a deficit of $1,525,726 in 1924 to $1,345,524 in 1925.

In the analysis of the income statement as compiled by the association and contained in Part VII of that record detailed figures were given of the income statements of the various groups, of the operating expenses by primary accounts and of the operating statistics.

Part VI—Derived Ratios

TABLE XVI—SIGNIFICANT RATIOS DERIVED FROM THE FOREGOING TABLES

	96 City Companies			49 Interurban Companies			76 Companies Operating Both City and Interurban Lines		
	1925	1924	Per Cent Increase or (D) Decrease	1925	1924	Per Cent Increase or (D) Decrease	1925	1924	Per Cent Increase or (D) Decrease
Railway operating revenue	$378,513,379	$377,665,237	0.22	$22,669,875	$23,896,461	(D) 5.13	$145,076,575	$151,060,943	(D) 3.95
Per mile of single track	$36,020	$35,844	0.49	$7,487	$7,919	(D) 5.46	$14,582	$15,072	(D) 3.25
Gross income	$82,144,657	$78,507,746	4.63	$4,235,308	$4,425,300	(D) 4.29	$29,710,829	$31,669,676	(D) 6.19
Per mile of single track	$7,817	$7,451	4.91	$1,399	$1,467	(D) 4.64	$2,986	$3,160	(D) 5.51
Passenger revenue	$369,248,085	$368,618,666	0.17	$14,305,650	$15,545,349	(D) 7.97	$125,329,071	$131,914,808	(D) 4.99
Per revenue passenger	6.8c.	6.6c.	3.03	[1]23.6c.	[1]23.4c.	0.85	[2]7.8c.	[2]7.9c.	(D) 1.27
Per total passenger	5.2c.	5.1c.	1.96	[1]22.5c.	[1]22.4c.	0.45	[2]6.9c.	[2]7.0c.	(D) 1.42
Per mile of single track	$35,139	$34,985	0.44	$4,725	$5,152	(D) 8.29	$12,597	$13,161	(D) 4.29
Per passenger car-mile	44.4c.	44.2c.	0.45	37.6c.	39.4c.	(D) 4.57	43.2c.	41.3c.	(D) 2.66
Per car operated	[3]$15,972	[3]$16,061	(D) 0.56	[4]$21,165	[4]$23,046	(D) 8.16	[5]$16,984	[5]$17,551	(D) 3.23
Per passenger car-hour	[6]$4.09	[6]$4.08	0.25	[7]$6.13	[7]$6.20	(D) 1.13	[8]$3.90	[8]$3.99	(D) 2.26
Revenue passengers	5,424,784,581	5,566,644,528	(D) 2.55	[1]54,653,956	[1]59,815,956	(D) 8.63	[2]1,474,106,555	[2]1,532,471,712	(D) 3.81
Per mile of single track	516,238	528,325	(D) 2.29	[1]18,695	[1]20,536	(D) 8.96	[2]160.508	[2]165,760	(D) 3.17
Per passenger car-mile	6.5	6.7	(D) 2.99	[1]1.6	[1]1.7	(D) 5.88	[2]5.1	[2]5.2	(D) 1.92
Per car operated	[3]227,662	[3]237,516	(D) 4.15	[4]92,493	[4]102,365	(D) 9.64	[9]229.937	[9]233.082	(D) 1.73
Per passenger car-hour	[6]60	[6]62	(D) 3.23	[10]37	[10]39	(D) 5.13	[11]56	[11]56	.....
Total passengers	7,041,296,156	7,170,501,884	(D) 1.80	[1]57,385,061	[1]62,586,043	(D) 8.31	[2]1,651,027,494	[2]1,724,917,579	(D) 4.28
Per mile of single track	670,070	680,545	(D) 1.54	[1]19,630	[1]21,487	(D) 8.64	[2]179.768	[2]186.576	(D) 3.65
Per passenger car-mile	8.5	8.6	(D) 1.16	[1]1.7	[1]1.7	.....	[2]5.7	[2]5.8	(D) 1.72
Ratio: Transfer to revenue passengers (per cent)	29.1	28.1	3.56	2.0	1.9	5.26	10.0	10.4	(D) 3.85
Revenue car-miles	836,591,328	838,047,485	(D) 0.17	47,762,458	48,490,250	(D) 1.50	334,882,516	342,094,274	(D) 2.11
Per mile of single track	79,613	79,538	0.09	15,774	16,071	(D) 1.85	33,661	34,133	(D) 1.38
Per car operated	[3]36,340	[3]36,812	(D) 1.28	[4]68,365	[4]70,117	(D) 2.50	[5]44.863	[5]45.094	(D) 0.51
Per car-hour	[6]9.0	[6]9.0	.....	[7]14.2	[7]13.8	3.06	[8]9.8	[8]9.8	.....
Car-hours	[6]81,572,794	[6]81,794,120	(D) 0.27	[7]1,768,776	[7]1,824,661	(D) 3.06	[8]27,372,156	[8]28,181,193	(D) 2.89
Per car operated	[12]3.974	[12]4.015	(D) 1.02	[13]9,964	[13]9,646	3.30	[14]4,334	[14]4,431	(D) 2.17

[1]48 companies. [2]74 companies. [3]83 companies. [4]36 companies. [5]57 companies. [6]87 companies. [7]35 companies. [8]67 companies. [9]55 companies. [10]34 companies. [11]65 companies. [12]76 companies. [13]29 companies. [14]53 companies.

Part VII—Analysis of Income Statement

TABLE XVII—ANALYSIS OF OPERATING STATEMENT—PER CENT INCREASE OR (D) DECREASE

	City Companies			Interurban Companies			Combined Properties		
	44 Cos. With Revenues of More Than $1,000,000 per Year Each	25 Cos. With Revenues of $250,000 to $1,000,000 per Year Each	27 Cos. With Revenues of Less Than $250,000 per Year Each	6 Cos. With Revenues of More Than $1,000,000 per Year Each	23 Cos. With Revenues of $250,000 to $1,000,000 per Year Each	20 Cos. With Revenues of Less Than $250,000 per Year Each.	26 Cos. With Revenues of More Than $1,000,000 per Year Each	28 Cos. With Revenues of $250,000 to $1,000,000 per Year Each	22 Cos. With Revenues of Less Than $250,000 per Year Each
Railway operating revenue	0.26	0.02	(D) 3.12	(D) 5.13	(D) 3.19	(D) 14.66	(D) 3.60	(D) 5.58	(D) 10.60
Railway operating expense	(D) 0.75	(D) 3.85	(D) 3.12	(D) 5.34	(D) 1.38	(D) 12.65	(D) 2.39	(D) 5.52	(D) 8.36
Net operating revenue	3.09	18.03	(D) 3.10	(D) 4.01	(D) 11.91	(D) 30.05	(D) 7.17	(D) 5.91	(D) 36.73
Net reveoue: Auxiliary operations	1.39	(D) 7.49	(D) 63.07	13.15	(D) 11.47	(D) 3.42	11.63	30.20	437.27
Taxes	2.08	(D) 6.43	3.90	(D) 7.42	(D) 4.41	(D) 12.62	(D) 1.02	(D) 0.43	(D) 14.18
Operating income	3.41	29.47	(D) 8.76	6.23	(D) 15.08	(D) 47.44	(D) 8.06	(D) 7.26	(D) 56.38
Non-operating income	14.18	0.23	(D) 46.93	(D) 1.66	(D) 29.94	(D) 23.21	13.99	(D) 5.15	(D) 25.47
Gross income	4.18	27.96	(D) 16.28	5.46	(D) 16.13	(D) 44.00	(D) 5.94	(D) 6.88	(D) 47.20
Deductions from gross income	2.52	(D) 21.01	(D) 0.52	3.34	(D) 6.82	2.84	(D) 6.73	(D) 8.73	(D) 5.20
Net income	10.27	.....	.....	.....	.....	.....	(D) 2.77	.....	.....
Operating ratio (per cent)	(D) 1.01	(D) 3.86	.....	(D) 0.23	1.87	2.36	1.24	0.07	2.51
Ratio: Net income to operating revenue	9.93	.....	.....	.....	.....	.....	0.90	.....	.....

TABLE XVIII—OPERATING EXPENSES BY PRIMARY ACCOUNTS—PER CENT INCREASE OR (D) DECREASE

	City Companies			Interurban Companies			Combined Properties		
Way and structures	2.73	(D) 13.83	(D) 3.96	(D) 6.39	(D) 4.81	(D) 9.00	(D) 3.47	(D) 13.18	(D) 8.28
Equipment	(D) 4.57	(D) 5.87	(D) 6.56	(D) 11.19	(D) 5.55	(D) 8.21	(D) 3.48	(D) 1.05	(D) 5.68
Power	(D) 6.04	6.62	(D) 1.36	(D) 4.53	(D) 4.06	(D) 33.57	(D) 4.59	(D) 4.67	(D) 11.33
Conducting transportation	0.22	(D) 5.24	(D) 2.57	(D) 3.81	2.02	(D) 7.76	(D) 4.57	(D) 5.14	(D) 8.03
Traffic	32.09	(D) 14.06	(D) 55.31	24.20	9.02	68.15	19.37	23.18	(D) 10.29
General and miscellaneous	1.21	(D) 0.72	3.11	(D) 5.56	1.95	(D) 6.11	3.19	(D) 1.72	(D) 6.84
Transportation for investment—Cr	(D) 11.27	81.94	.....	(D) 34.33	58.40	.....	10.72	.....	58.33
Total operating expense	(D) 0.75	(D) 3.85	(D) 3.12	(D) 5.34	(D) 1.38	(D) 12.65	(D) 2.39	(D) 5.52	(D) 8.36

TABLE XIX—OPERATING STATISTICS—PER CENT INCREASE OR (D) DECREASE

	City Companies			Interurban Companies			Combined Properties		
Passenger car-miles	(D) 0.17	(D) 0.05	(D) 0.98	(D) 5.89	(D) 0.48	(D) 6.87	(D) 2.72	(D) 0.39	(D) 4.60
Total revenue car-miles	(D) 0.17	(D) 0.07	(D) 1.08	(D) 4.68	2.54	(D) 6.75	(D) 2.26	(D) 0.66	(D) 5.41
Revenue passengers	(D) 2.56	(D) 1.98	(D) 4.29	(D) 9.47[9]	(D) 5.82	(D) 13.45	(D) 3.23[19]	(D) 6.92	(D) 10.28
Transfer passengers	1.03[1]	(D) 3.94[4]	(D) 8.71[6]	(D) 9.05[10]	(D) 2.98[13]	(D) 8.82[16]	(D) 8.04[20]	(D) 2.16[22]	(D) 11.35[24]
Total passengers	(D) 1.76	(D) 2.19	(D) 5.11	(D) 9.13[9]	(D) 5.48	(D) 13.22	(D) 3.86[19]	(D) 6.52	(D) 10.43
Passenger revenue	0.23	(D) 0.84	(D) 2.98	(D) 9.31	(D) 6.31	(D) 9.58	(D) 4.72	(D) 5.84	(D) 12.37
Revenue car-hours	(D) 0.21[2]	(D) 0.92[4]	(D) 2.39[7]	(D) 4.33[11]	(D) 0.44[14]	(D) 8.59[17]	(D) 2.74[20]	(D) 2.92[22]	(D) 6.94[25]
Passenger car-hours	(D) 0.20[2]	(D) 0.92[4]	(D) 2.34[7]	(D) 4.20[11]	(D) 3.22[14]	(D) 8.23[17]	(D) 2.82[20]	(D) 2.94[22]	(D) 6.99[25]
Miles of single track	(D) 0.44	1.59	(D) 0.09	0.02	0.66	(D) 0.10	(D) 0.57	(D) 0.84	(D) 2.84
Passenger cars operated *a*	0.76[3]	(D) 0.23[5]	(D) 0.55[8]	4.31[12]	2.04[15]	(D) 10.34[18]	(D) 1.94[21]	(D) 4.09[23]	(D) 7.83[26]

a Average maximum number of passenger cars in service daily.

[1] Reported by 41 companies.
[2] Reported by 42 companies.
[3] Reported by 35 companies.
[4] Reported by 22 companies.
[5] Reported by 23 companies.
[6] Reported by 16 companies.
[7] Reported by 23 companies.
[8] Reported by 25 companies.
[9] Reported by 5 companies.
[10] Reported by 1 company.
[11] Reported by 2 companies.
[12] Reported by 3 companies.
[13] Reported by 8 companies.
[14] Reported by 16 companies.
[15] Reported by 19 companies.
[16] Reported by 3 companies.
[17] Reported by 17 companies.
[18] Reported by 14 companies.
[19] Reported by 24 companies.
[20] Reported by 22 companies.
[21] Reported by 19 companies.
[22] Reported by 25 companies.
[23] Reported by 20 companies.
[24] Reported by 12 companies.
[25] Reported by 20 companies.
[26] Reported by 18 companies.

These are of considerable value as an extension of the accounts under the various groups of properties, but on account of space limitations it was decided not to show the totals or the amount of the increase or decrease, but merely the per cent of increase. This method of treatment has made it possible to combine into three tables a series of figures that, as carried out in full in the original compilation, cover 27 tables.

Connecticut Interurban Sold Under Foreclosure

The Hartford & Springfield Street Railway, Warehouse Point, Conn., at a sale held on April 27, passed into the hands of the protective committee of bondholders headed by Francis R. Cooley, Hartford, Conn. Mr. Cooley bid $10,000 for the property, franchises and rolling stock of the company. No other bids were received. The sale was recorded as a personal one. The sale was held to foreclose a mortgage of $600,000 with interest amounting to $260,000, making the total debt $860,000.

Mr. Cooley accepted the property subject to a prior mortgage of $161,000 on the Windsor Locks Traction Company property, taxes of $72,000, receiver's certificates of $125,000 and a reservation of $25,000 for possible judgments against the company .

Terms of the plan under which the company will be reorganized have not been announced.

Deficit in Des Moines

For the year ended Dec. 31, 1925, the Des Moines City Railway, Des Moines, Iowa, reports a deficit of $18,114 after the consideration of dividends on preferred stock. The net earnings were 2.70 times annual bond interest charges. The company operated under a service-at-cost franchise with fares increased on Oct. 1, 1925, to 10 cents cash, 9½-cent ticket, children 5 cents and school children 2½ cents. The accompanying table gives the income account for last year.

INCOME ACCOUNT OF THE DES MOINES CITY RAILWAY FOR THE TWELVE MONTHS ENDED DEC. 31, 1925

Revenue	
Passenger	$2,248,092
Other	96,945
Total	$2,345,037
Operating expenses and taxes	
Operating expenses	1,541,176
Taxes	152,000
Total	$1,693,176
Net earnings	$651,860
Deductions	
Interest on bonds	241,050
Other interest	83,531
Other charges	7,768
Total	$332,350
Balance	$319,510
Depreciation reserve	217,000
Balance	$102,510
Dividends — Preferred stock	120,625
Deficit	$18,114

Legal Notes

FEDERAL SUPREME COURT—*Steam Railroads Required to Establish Through Routes and Joint Rates and to Interchange Switching Service with Electric Railway*

Four steam railroads entering Michigan City, Ind., refused to establish through routes and joint rates and to interchange switching service with the Chicago, Lake Shore & South Bend Railway, an electric road also entering that city. After a hearing, the Interstate Commerce Commission directed the steam railroads to remove this discrimination which it termed unjust, and the present case was the result of a request by the steam railroads for an injunction, relieving them from complying with the order of the commission. Of the four steam railroads, only one had physical connection with the electric railway, but the court held this fact did not invalidate the order of the commission as to all four roads. The claims that the electric railroad would originate relatively little business, that its service was essentially dissimilar and other objections were overruled by the court, in view of the order of the commission, for whose judgment the court said it would not substitute its own. [Chicago, I. & L. Railway et al, vs. United States et al. 46 Supreme Court Rep., 226.]

ILLINOIS—*Court Will Reverse Issue of Certificate by Commission If Not Justified by Evidence*

In this case the Illinois Commerce Commission granted a certificate of convenience and necessity to a bus line for a route then being served by another bus company, which presented evidence to show that it was giving all of the service practicable for the traffic and there was not enough to justify the operation of two lines. The Supreme Court of Illinois accepted this view and declared the issue of the certificate void on the ground that the action of the Commission was unreasonable, arbitrary and confiscatory. [Superior Motor Bus Co. vs. Community Motor Bus Co., 150 Northeast. Rep., 668.]

INDIANA — *Carrier's Liability When Car Is Attacked by Highwaymen*

An interurban car was boarded by two highwaymen, who intimidated the crew and passengers and robbed the latter. One of the passengers brought suit against the company because of loss suffered and injuries received. The Supreme Court of Indiana, in reversing a judgment for the plaintiff declared a railroad is not an insurer of the safety of its passengers, as against the consequences of felonious acts done by persons not in its employ and over whom it has not control. The employees in charge of a train must afford passengers protection against such attacks when the employees have the means for such prevention or by the exercise of reasonable care could have provided themselves with the means or could have prevented the attack. In this case, no such failure or refusal was shown. [Terre Haute I. & E. T. Co. vs. Scott, 150 Northeast. Rep., 777.]

KENTUCKY — *Duty of Person at an Interurban Crossing.*

The Kentucky law does not require a person crossing a railroad track in that state to stop, look and listen, but only to exercise the care of a reasonably prudent man under similar circumstances. [Bohmer's Adm'x vs. K. T. & T. Co., 279 Southwest. Rep., 955.]

MARYLAND — *Obligation to Maintain Bridge under Heavy Traffic.*

A railway company constructing its track over private right-of-way which crossed certain streets received permission from the city to construct a cut for its track provided it would build and "at all times thereafter" maintain a substantial bridge for one of the streets crossed, the bridge to be like a drawing which was made part of the permission granted. Such a bridge was built, but, after 16 years, traffic increased greatly and for this reason, and because it wished to lay water mains over the bridge, the city asked the railway to strengthen it. It was held that the railway was not obliged to do more than maintain a bridge of the light character originally constructed. [City of Baltimore vs. Washington, B. & A. Elec. Ry., 132 Atlantic Rep., 269.]

NEW JERSEY — *City Must Conform to Own Ordinance in Granting Bus License.*

A city had passed an ordinance which required applicants for bus licenses to file information on a number of points and declared that such licenses would be granted only when necessary or advisable in the interests of the public. Later, the city granted a license to an applicant who did not give all the information called for in the ordinance, and there was no determination as to the advisability or necessity of the line. In consequence, the Supreme Court of New Jersey set aside the license. [Bergen Bus Line vs. Hackensack Improvement Commission, 132 Atlantic Rep., 296.]

NEW JERSEY—*Injury to Lineman without Rubber Gloves.*

A lineman employed by a city to repair the fire alarm system attempted to clear wires after a storm without wearing rubber gloves, and was injured from excessive voltage from an electric power wire. His action was held to be contributory negligence. [Brice vs. Atlantic Coast E. R. Co. et al., 132 Atlantic Rep., 253.]

NEW YORK—*Railway Not Liable to Pass Rider When Carried Beyond Point to which Pass Was Good.*

The plaintiff was an employee of the city and had a pass permitting him to ride without charge between certain points on a trolley line crossing a bridge but freeing the company in case of accident. The car on which the plaintiff was riding escaped from control and he was injured, but not until the car had run past the point to which the pass was valid. The company was held not liable as the injured person had not become a passenger from whom fare was due. [Hester vs. Manhattan Bridge 3-Cent Line, 212 New York Supp., 292.]

NEW YORK—*Improper Questions of Plaintiff's Counsel Held to Require New Trial.*

A person injured in an accident with a trolley car received judgment in the trial court. In that trial the plaintiff's counsel asked the motorman if he was a "strike breaker" and other questions which were held to be prejudicial to the defendant, and a new trial was granted. [Romeo vs. United Traction Co., 212 New York Supp., 435.]

NEW YORK—*Railroad Failing to Begin Construction.*

The section in the railroad laws providing that the corporate existence of railroads failing to begin construction within five years after filing a certificate of incorporation shall cease, applies to surface street railways. [Hanbury vs. Metropolitan Securities Co., 213 New York Supp., 555.]

PENNSYLVANIA—*Duty of Pedestrian at Street Crossing.*

At a street crossing in a city, it is not contributory negligence for a pedestrian to cross the street while a car is approaching. He has a right to assume that the motorman will approach the intersection with due caution. [Murphy vs. P. R. T. Co., 132 Atlantic Rep., 194.]

WASHINGTON—*Bus Not Liable for Injury to Unlighted Truck.*

The driver of a truck who had continued driving after dark without lights and had stalled on a curve on the highway was held guilty of contributory negligence sufficient to prevent a recovery for injury to a fellow employee who was assisting him in the operation of the truck. [Martin vs. Puget Sound Elec. Ry., 241 Pacific Rep., 360.]

WASHINGTON — *Qualification of Rule That Company Is Not Responsible for Injury to Pedestrian Caused by Overhang of Car on a Curve*

In Gannaway v. Puget Sound P., L. & T. Co. (138 P., 267) it was held not to be the duty of street railway companies to warn pedestrians on the street that there is an overhang to an ordinary street car when it rounds a curve. In the present case, at a crossing which was protected by a traffic officer and signals, a pedestrian started to make the crossing at a time when the signals gave permission to do so. When half way across, the crossing signal was changed, and the pedestrian took what she thought was a safe position away from the car track, though in the middle of the street, but was struck by the overhang of the car, which was waiting at the corner and started to go around a curve at the signal of the traffic officer. In these circumstances, the court held that the question of the pedestrian's contributory negligence should have been submitted to a jury. [White et ux, vs. City of Seattle, 240 Pacific Rep., 903.]

Personal Items

J. D. Hallman Back in Service at Atlanta

J. D. Hallman, a pioneer in railway transportation in Atlanta, Ga., was named president of the Georgia Railway & Electric Company on April 19, succeeding Thomas K. Glenn, retiring head of the company, the properties of which are at present leased to the Georgia Railway & Power Company. Mr. Hallman is 84 years old.

Going to Atlanta soon after the war between the states, Mr. Hallman entered the mercantile business. When the first horse car line was established from the west end to the heart of the city he was an active backer of the enterprise. With the late Joel Hurt, he was one the pioneer citizens who established the first electric line between Inman Park and Five Points. Mr. Hallman served for many years on the board of directors of the Georgia Railway & Power Company, but had been in retirement from active business life for several years.

At the same meeting James D. Robinson was elected vice-president of the Georgia Railway & Electric Company. Mr. Robinson is president of one of Atlanta's oldest and best-known business organizations, and is also vice-president and a director of the Fourth National Bank. For many years he has been a director of the Georgia Railway & Power Company.

W. H. Wright, secretary of the company, was elected a director to fill the place made vacant by the resignation of Mr. Glenn.

Changes in Capital Traction at Washington

H. D. Crampton, secretary and treasurer of the Capital Traction Company, Washington, D. C., has been elected a vice-president by the board of directors. Mr. Crampton will continue to serve as secretary and treasurer. He has been with the company for more than 30 years.

J. E. Heberle, who has been assistant secretary of the company for several years, has been made assistant to the president.

J. Fleming, purchasing agent, has been made assistant secretary, but will continue as purchasing agent.

Former Governor Heads West Virginia Interurban

W. A. MacCorkle, now the president of the Charleston Interurban Railroad, Charleston, W. Va., is a new figure in the electric railway field, although he has engaged in railroad building for many years. It was through his earnest efforts that the Coal River Railroad and the Elk River branch of the Baltimore & Ohio were built. In connection with his work in land development, bridge-building and railroad work he has published many books on these subjects.

By profession Mr. MacCorkle is a lawyer, and he has been active in public life. He was Governor of the state of West Virginia and state Senator and has served a number of commissions. In his capacity as president of the Charleston Interurban Railroad he succeeds the late F. M. Staunton. Mr. MacCorkle has also been made chairman of the board of that company.

Arthur M. Hill Advanced at Charleston

Arthur M. Hill, the new vice-president and general manager of the Charleston Interurban Railroad at Charleston, W. Va., is a well-known figure in the railway and bus field. Last year he was elected president of the state bus operators' organization, having served as chairman of the West Virginia Motor Transportation Association's committee on legislation. When the Bus Division of the American Automobile Association was formed on March 19 as the national organization of bus operators, he was elected its first chairman.



A. M. Hill

Mr. Hill, formerly treasurer, will now have charge of the Charleston Interurban Railroad's transportation system, including its bus lines. He succeeds I. N. Smith, who had been general manager, but who will now be secretary and treasurer. Mr. Hill is a native of Charleston, but spent a large part of his boyhood in the state of Arizona. He enrolled at the University of Missouri, and after completing his studies engaged for a period of seven years in the banking business at Charleston. From this work he entered the United States army, to do his duty during the war. When he returned to civil life he became an executive of the Charleston Interurban Railroad.

He is one of the exponents of the principle of co-ordinated transportation. He says frankly that the growth and development of the bus has been of great help in getting better results from rail operation.

J. E. Carnes a Headliner

J. E. Carnes, recently appointed to take charge of the bus transportation department of the Cincinnati Street Railway, Cincinnati, Ohio, has been discovered by the Cincinnati *Post*. Of course, to the car riders of that city Mr. Carnes has been known for his geniality for many years, also to the newspapers for the same qualities, but his advancement made of him a public figure. So on its editorial page for April 1 the *Post* played Mr. Carnes up. Alfred Segal was the author of the sketch. He headed it: "Being the Account of One Who Has Succeeded by the Performance of the Day's Work at His Corner." It does not do to adulterate a sketch of this kind. Here is Mr. Segal's account of Mr. Carnes word for word:

Mr. Carnes steps up in the world. Mr. Carnes has made a success. He has not come to sudden riches, and it is probable that he never will be a rich man.

Mr. Carnes has made a success of the day's work.

Jesse Carnes was a street car conductor on the Walnut Hills lines. In his job there are no opportunities for fame or fortune. One must be courteous; one must be conscientious. There is no call for daring enterprise on the back of a street car; no high places from which to shine in the world. One must be considerate; one must be dutiful.

Jesse Carnes made a success of the day's work on the back of the street car, being courteous, considerate and dutiful.

He was promoted to inspector. There are no opportunities for riches or glory in an inspectorship. One works to do the job well. On bitterest days one stands at street corners to direct the traffic. There are tangles to be unraveled and one must not lose his head in the chaos. There are impatient people who demand when, if ever, the next car is coming, and one must know how to answer wrath with a kind word.

Jesse Carnes made a success of the day's work on the street corners, directing the traffic, keeping his head on his shoulders, and answering with gentle words.

In these tasks he continued year after year, doing the day's work as if there were great rewards of riches or glory in it. To do it well he regarded as his success.

At whatever corners he served he made the best of it. When the officials of the railway determined to establish bus lines, they looked about for one to direct them as superintendent. Jesse Carnes did not apply for the place, but the success of the day's work had lifted him up to a high place in the esteem of the officials and he was chosen.

So Mr. Carnes steps up by the success of the day's work.

We are painfully conscious of the fact that there is no thrill in this story of success. The people thrill only to the success of go-getters who walk today and ride in glittering cars tomorrow.

The success of the day's work does not quicken the blood of the people. They'd rather hear of the success of one who has got rich quickly without work.

The appointment of Mr. Carnes was noted in the JOURNAL for March 6.

F. W. Webster Honored

F. W. Webster, well known in California traction circles, has been appointed vice-president and general manager of the Peninsula Railway and the San José Railroad, with headquarters in San Francisco, Cal. The appointment was announced by Paul A. Shoup, executive vice-president of the Southern Pacific Company, which controls these companies. The appointment was made to fill the vacancy created by the death of F. E. Chapin.

For more than ten years Mr. Webster has been the general manager of all the electric lines in the San Joaquin Valley affiliated with the Southern Pacific. His connection with Central California railroading goes back to the days of Harriman's dream of a great

central state system of electrified lines. He went to Stockton in 1904 to lay out a replacement system of the old narrow gage car line. The new electric line was constructed in 1906. Following this Mr. Webster was transferred to Fresno, to put in a modern electric railway there. Since that time he has been identified with railroading in this section of California. Up to April 10 he was vice-president and general manager of the Stockton Electric Railroad, the Fresno Traction Company, and the Visalia Electric Railroad, and general manager of both the Central California Traction Company and the Minarets Western.

Mr. Webster states that his new appointments will simply supplement the work he is already doing. The situation would mean that his departmental heads would be called upon to do an increased amount of work, as he would no longer be able to visit so frequently all of his offices. For some years Mr. Webster's headquarters have been in Fresno, although he spent most of the time traveling from one to another of the roads under his supervision.

T. J. Brennan Resigns from Dayton Property

Thomas J. Brennan, general manager of the Dayton, Covington & Piqua Traction Company, West Milton, Ohio, has resigned after 22 years service. When eighteen years old Mr. Brennan started as a conductor, remaining in this position two years. When he started to advance his promotions came rapidly. He served in turn as chief dispatcher, head of the line and track departments, assistant superintendent of transportation, purchasing agent and claim agent.

Mr. Brennan has done much to make this one of the popular interurban lines in this section. His efforts in public relation and safety work have done a great deal to keep this line in operation. He has just completed a rehabilitation program providing for track improvements, installation of one automatic substation, seven modern lightweight cars, six freight trailers and two freight motor cars.

T. K. Glenn of Atlanta to Retire

Thomas K. Glenn, long president of the Georgia Railway & Electric Company, Atlanta, Ga., the railway lines of which are operated under lease by the Georgia Railway & Power Company, is to retire from that position to devote more of his time to banking interests.

Mr. Glenn began his railway career in 1891 as secretary to Joel Hurt, then vice-president and general manager of the Atlanta Consolidated Street Railway. In 1902, when the Georgia Railway & Electric Company was organized, he was placed in charge of the claims department and the following year was appointed to the position of vice-president and general manager. This position he resigned in 1908 to become affiliated with the Atlanta Steel Hoop Company, one of the largest manufacturing plants of its kind in the South. In 1913 he was elected third vice-president of the Georgia Railway & Power Company, of which he had also been a director. Several years later he was elected president of the Georgia Railway & Electric Company to succeed the late Frank E. Block. Mr. Glenn is president of the Atlanta & Lowry National Bank. He is one of the foremost figures in financial affairs in Atlanta.

H. D. Bercaw, New Akron Manager, Talks of Franchise

H. D. Bercaw, the newly appointed manager of the southern division of the Northern Ohio Power & Light Company, formerly the Northern Ohio Traction & Light, with offices at Canton, states that the company is working for a new franchise which will give adequate transportation facilities with centralized management. He said he believed that a public utility should be a monopoly and that future developments would lead to that.

Mr. Bercaw, whose appointment as manager was referred to in the ELECTRIC RAILWAY JOURNAL, issue of Jan. 9, page 91, was claim agent of the Northern Ohio Power & Light Company at Canton for five years. His transportation duties in Canton might be termed his biggest interest. Since his association with that company he has extended the service by buses in many parts of the city. Though Mr. Bercaw is an Ohioan by birth, he lived a number of years in Indiana. He was born in Darke County, Ohio, but at the age of thirteen moved to Indiana. He attended the Indiana University a year and taught history in the high school at Anderson, Ind., before going to his native state to live. He is a graduate of Otterbein College at Westerville. Mr. Bercaw, associated with traction interests for many years, has full authority in his new position as manager of the Canton and Massillon systems as well as the company's interurban lines south of Akron. In announcing his appointment A. C. Blinn, vice-president and general manager of the entire property, said that the company had felt for some time that the industrial and commercial development of Canton demanded a local resident manager.



H. D. Bercaw

Norman Lee, whose experience in transformer design is international, has recently joined the American Brown Boveri Electric Corporaton at Camden, N. J. After graduating as an electrical engineer from the University of Wisconsin Mr. Lee held several positions with the French Thomson-Houston Company, Paris. Aften ten years with that company he joined the A.E.F. in France. Following the war Mr. Lee designed and manufactured transformers under his own name. In 1923 he returned to this country and joined the Allis-Chalmers Company as a designer of power transformers.

W. H. Vinnedge, who until recently held a position as sales engineer with the Servel Corporation, has joined the railway engineering staff of the American Brown Boveri Electric Corporation. He was graduated from Purdue University.

Jamestown Personnel Reorganized

The adoption of a plan of organization to fix definite control of the property of the Jamestown Street Railway, the Jamestown, Westfield & Northwestern Railroad and the Jamestown Motor Bus Transportation Company, Jamestown, N. Y., was announced recently by George L. Maltby, general manager. Under the new plan Leon H. Johnson becomes general superintendent of the transportation lines; W. H. Pickard, traffic manager; R. A. White, comptroller in charge of finances; F. H. Kiblin, real estate and tax agent; Richard G. Holmes, superintendent of power distribution; Keith L. Conners, superintendent of motive power; Eugene A. Post, superintendent of buildings and bridges; Axel Westergren, superintendent of roadways; C. L. Lammers, superintendent of transportation; A. Raymond, superintendent of buses; Walter J. Cole, storekeeper; E. H. Waterman, assistant to the general superintendent; Ray Miller, car accountant and paymaster.

Obituary

Frank G. Hart, superintendent of transportation of the Bloomington, Ill., division of the Illinois Power & Light Corporation, died April 21. He had been connected with the traction system in Bloomington more than 30 years and for nearly four years was superintendent of the transportation division.

Ray W. Reynolds, at one time superintendent of the Terre Haute, Indianapolis & Eastern Traction Company, at Lebanon, Ind., and later a superintendent at South Bend, Ind., died at his home in South Bend recently. He was a graduate of Purdue University and of Armour Institute of Chicago. He was 43 years old.

William Keller, day depot master at East New York station of the Brooklyn-Manhattan Transit Corporation, Brooklyn, N. Y., died recently. Mr. Keller began his railroad career in 1898 as a conductor with the old Nassau Railroad at the Ninth Avenue depot, but was two years out of service before being appointed at East New York depot in 1908. He was appointed night depot master on Aug. 6, 1914, and in June, 1916, was appointed to the position he held at the time of his death.

Manufactures and the Markets

News of and for Manufacturers—Market and Trade Conditions
A Department Open to Railways and Manufacturers
for Discussion of Manufacturing and Sales Matters

Grand Rapids Cars Are Soon to Be Delivered

Construction of the 27 new de luxe type street cars for the Grand Rapids Railway, Grand Rapids, Mich., is nearing completion and it is expected that delivery will be begun shortly. The cars when delivered will be equipped with spring bumpers of the auto type at each end. They will have two headlights at the front end in shapely reflectors attached to the front dasher. A tail-light and spotlight are provided at the rear end of the cars. The unit as shipped will be equipped with de luxe highly upholstered individual bucket type seats. The car bodies will be mounted on St. Louis Car Company E.I.B. type trucks, the standard equalized easy-riding graduated spring truck of that company. As an added feature the side frame equalizer will be adaptable to receive either a friction bearing box or a roller bearing box.

Twenty-three of the cars will be equipped with friction bearing boxes and four will be equipped with roller bearing boxes, two each of the Hyatt and S K F types. At any future time, at the pleasure of the railway, the friction bearing boxes may be removed and roller bearing boxes installed without any alterations in the truck frame. This particular truck was developed along these lines, especially for the Grand Rapids Railway, and it is the first installation of its kind.

The new cars will be provided with the same type of light shield, equipped with high-powered lamps to illuminate the front dash, as appeared on the "St. Louis" sample car built by the St. Louis company some time ago. The principal specifications of the Grand Rapids cars were published in the issue of ELECTRIC RAILWAY JOURNAL for Dec. 5, 1925.

Graybar Organization Changes

A reorganization of the sales department, involving the reallocation of the managing personnel and the creation of several new activities, to take effect immediately, has been announced by G. E. Cullinan, vice-president in charge of sales of the Graybar Electric Company.

The reorganization, together with the staff designation of the personnel, is as follows: M. A. Curran, assistant to vice-president, formerly manager of the central station department; J. L. Ray, general supply sales manager, formerly manager of supply and equipment department; E. A. Hawkins, general telephone and appliance sales manager; G. F. Hessler, general utilities sales manager, formerly manager line material sales department; G. K. Heyer, assistant general supply sales manager, formerly telephone sales manager; A. J. Eaves, public address and carrier current sales manager; P. M. Rainey, telephone sales manager, formerly sales development manager; G. E. Chase, broadcasting sales manager, formerly broadcasting sales engineer; O. E. Richardson, broadcasting sales engineer; J. W. Skinkle, signaling sales manager; A. E. Hetzner, signaling sales engineer; and A. S. Wise, appliance sales engineer.

The above changes in staff personnel are the culmination of a reorganization of the Graybar general sales organization which has been in course of development for some time.

Rehabilitation Program in West Milton

An improvement program for West Milton, Ohio, was recently completed by T. J. Brennan, general manager of the Dayton, Covington & Piqua Traction Company. He recommends the acquisition of seven modern, lightweight cars, six freight trailers and two freight motor cars. Rebuilding of tracks and the installation of one automatic substation are included in his program.

Chicago Will Have 100 New Cars

The Chicago Surface Lines has been authorized to purchase 100 new street cars. These are expected practically to duplicate a similar group of 100 cars which were ordered in the spring of 1924 and placed in service the same year. Bids have been requested on the units, which are to be double-truck, double-motor cars adapted for multiple-unit operation. Complete data on the cars purchased in 1924 were published in the issue of ELECTRIC RAILWAY JOURNAL for Nov. 15, 1924. That the present order for 100 cars is to be placed in the last year of the Surface Lines' franchise is evidence of the confidence which the officers of the company have in the satisfactory outcome of the complex local situation and in the future of the electric railway industry.

Metal, Coal and Material Prices

Metals—New York	April 27, 1926
Copper, electrolytic, cents per lb	14.037
Copper wire, cents per lb	16.00
Lead, cents per lb	7.875
Zinc, cents per lb	7.22
Tin, Straits, cents per lb	63.75
Bituminous Coal, f.o.b. Mines	
Smokeless mine run, f.o.b. vessel, Hampton Roads, gross tons	$4.125
Somerset mine run, Boston, net tons	1.975
Pittsburgh mine run, Pittsburgh, net tons	1.95
Franklin, Ill., screenings, Chicago, net tons	1.925
Central, Ill., screenings, Chicago, net tons	1.50
Kansas screenings, Kansas City, net tons	2.50
Materials	
Rubber-covered wire, N. Y., No. 14, per 1,000 ft	$6.25
Weatherproof wire base, N.Y., cents per lb.	18.00
Cement, Chicago, net prices, without bags	2.10
Linseed oil (5-bbl. lots), N.Y., cents per lb.	11.04
White lead in oil (100-lb. keg), N. Y., cents per lb	15.50
Turpentine (bbl. lots), N. Y., per gal	$0.90

W. E. Kelly Now with Hegeman-Castle

W. E. Kelly has been appointed general manager of the Hegeman-Castle Corporation, with headquarters in the Railway Exchange Building, Chicago, Ill., replacing H. T. Heath, who has resigned. Mr. Kelly entered the service of the Ilinois Central Railroad in 1898, serving in various capacities in the store, mechanical and purchasing departments and leaving in 1907 to engage in the railway supply business as manager of the Chicago territory for the Elkhart Rubber Works.

In 1911 he accepted service with the Patton Paint Company as railroad sales representative in Chicago and the Western territory and was appointed manager of railway sales in 1916, resigning in 1918 to go with the Central Railway Signal Company, Boston, Mass., as Western representative. He will still continue to represent the Central Railway Signal Company in addition to his new duties as general manager of the Hegeman-Castle Corporation.

Storage Battery Business Is Good

Activity in the storage battery field so far in 1926 has been on a par with the corresponding trade in 1925, at least in the experience of the Electric Storage Battery Company, Camden, N. J., one of the largest manufacturers of batteries in the United States. Incidentally, the 1925 period was exceptionally good, so that the previous statement has considerable significance. Herbert Lloyd, president of the company, stated at the annual meeting of stockholders that indications for the remainder of 1926 are very good and that there has been no let-up in the volume of new business thus far in the year.

Chicago Gets Substation from Westinghouse

The Westinghouse Electric & Manufacturing Company has recently received an order from the Chicago Surface Lines for a 4,000-kw., 600-volt direct-current automatically controlled substation to be located on Grimm Avenue, Chicago, Ill. The order calls for two 2,000-kw., 60-cycle, 600-volt synchronous converters with six 667-kva. OISC, single-phase, outdoor transformers, stepping down from 2,000 volts high tension to converter voltage. Automatic switching equipment for the control of these two units and a set of supervisory control equipment are also included in this contract.

The automatic switching equipment will provide full protection for unattended operation of two 12,000-volt, three-phase incoming lines, two 2,000-kw. synchronous converters and seven 600-volt d.c. feeders. Four electrically operated high-tension oil circuit breakers will be provided and arranged so that by means of a high-tension bus either or both converters may be sup-

plied from either or both incoming lines.

The total output of the station will be supplied to the present direct-current network through seven 2,000-amp., short-circuit detector, automatic service-restoring feeders.

Supervisory control of the synchronous visual type will permit the dispatcher located in the Crawford Avenue station to supervise and control the operation of this Grimm Avenue station.

Electrical Business in Germany Shows Upward Trend

German electrical equipment manufacturers enjoyed a prosperous export year in 1925, according to recently published statistics. The market price for stocks of electrical equipment companies showed this German industry to be one of the most prosperous of the country. In fact, as a whole it ranked third only behind banking and brewing in maintaining a high level of stock quotations.

Domestic business was fairly good considering general economic conditions. Foreign business was satisfactory even in comparison with previous inflation years, and some of the larger companies were in such an advantageous position that they were able to secure large foreign loans. Prices both at home and abroad were maintained in all lines. Several large foreign contracts for complete power plants were obtained.

Railway electrification was extended to additional lines in various parts of the country. The electrical development of Germany utilizing both lignite deposits and water power spread rapidly during 1925 and is continuing, acording to Trade Commissioner Theodore Pilger of Berlin.

R. F. Fiske Heads Sales for Nuttall

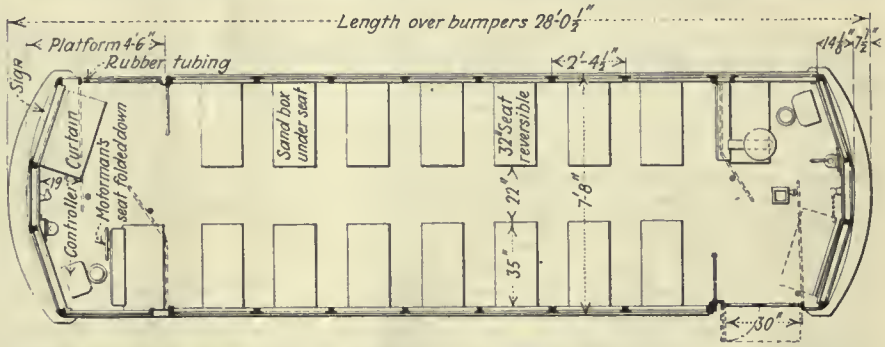
R. F. Fiske, for several years manager of the R. D. Nuttall Company, Philadelphia office, has been appointed sales manager, with headquarters at Pittsburgh. He takes the place of Q. W. Hershey, resigned. John E. Mullen has been appointed assistant sales manager.

Mr. Fiske is a New Englander, receiving his early education in the public schools of Massachusetts and his technical education at Harvard. After graduation he was with General Electric Company at the Lynn and Pittsfield plants. He moved to Pittsburgh in 1908 to join the sales force of the Union Electric Company, Nuttall agents. In 1917 he became a member of the Nuttall sales force, and in 1919 was made manager of its Eastern sales activities. His recent appointment is a well-earned recognition of his ability to direct both sales policies and men for the company.

Mr. Mullen entered the employ of the Nuttall company in the capacity of a junior clerk. He has held many important positions with this concern, and is classed as one of the old-timers in point of service, with a thorough knowledge of the company's policies and products.

Delivery of Cars to Fort Smith Is Made





Shipment has been made of six single-truck, double-end Birney safety cars constructed by the American Car Company, St. Louis, Mo., for the Fort Smith Light & Traction Company, Fort Smith, Ark. The cars, whose bodies weigh 6,500 lb., will have a seating capacity of 32. The principal specifications on these new units are appended here:

Length over all	28 ft., ¾ in.
Truck wheelbase	8 ft.
Width over all	8 ft.
Height, rail to trolley base	9 ft., 10⅝ in.
Body	All steel
Interior trim	Mahogany
Roof	Arch
Air brakes	Westinghouse
Axles	Brill
Bumpers	Channel
Car signal system	Faraday
Car trimmings	Bronze
Compressors	Westinghouse DH-16
Control	K-63
Curtain fixtures	Curtain Supply Company
Curtain material	Pantasote, K-2-86
Destination signs	Hunter illuminated
Door-operating mechanism	American Car Company
Fare boxes	Johnson, DM-3
Wheelguards	American Car Company
Gears and pinions	General Electric
Hand brakes	American Car Company with drop brake handle
Heater equipment	Consolidated
Headlights	Crouse-Hinds "Golden Ray"
Journal bearings	Friction type
Journal boxes	Brill
Lightning arresters	General Electric
Motors	Two GE-264, inside hung
Finish	Pratt & Lambert, vitrallte railway enamel
Registers	Sterling
Sanders	American Car Company
Sash fixtures	O. M. Edwards
Seats	Brill "Waylo" type
Seating material	No. 203, green plush
Slack adjuster	Brill
Springs	Brill
Step treads	Feralun
Trolley catchers	Ohio Brass
Trolley base	Ohio Brass
Trolley wheels	Kalamazoo with bayonet harps
Trucks	Brill special No. 79-E
Ventilators	Brill exhaust type
Wheels	Rolled steel, 26 in.

Use of Balloon Tires on Buses Increasing

That low-pressure, or balloon, tires are coming into use on buses and motor trucks at a much faster rate than is generally realized was indicated by J. M. Linforth of the Goodyear Tire & Rubber Company at a meeting of the Cleveland section of the Society of Automotive Engineers. He stated that since 1923 his company had put on approximately 300 of this type of tire for buses and had been watching their performance closely. Seven sizes are now in regular factory production, and of these Goodyear believes that the 36x8.25 size will be the most popular, as it has been found most suitable for the average 29-passenger bus. The 34x7.50 size will be used on vehicles of smaller capacity. Mr. Linforth went on to say:

Our experience seems to indicate that at least as much mileage should be obtained from the balloon tires as from high pressure tires; tests have shown actually greater mileage. We are convinced from actual results that they should not puncture more easily or frequently than high pressure tires.

One of the important advantages derived by the use of balloon tires is the decrease in running time of the vehicle due to an increase of the minimum speed without any increase of maximum speed. We have found that the motorcoach balloon tires hold the road on wet as well as dry surfaces much better than high pressure tires. Many operators have remarked that they are able to make stops with balloon tires that would be impossible with high pressure tires. Thus the balloon tires add to the safety of motor coach operation.

Yellow Buses Will Be Among General Motors Exhibits

Included in the permanent exhibit which the General Motors Corporation will open on the Steel Pier, Atlantic

City, during July will be the products of the Yellow Truck & Coach Manufacturing Company. This will be the first permanent exhibit at which all of the products of General Motors will be displayed under one roof and will occupy 22,000 sq.ft. of floor space. In addition to Yellow Truck & Coach products, the exhibit will embody the six lines of General Motors passenger cars, GMC trucks, Fisher body products and all of the various General Motors parts and accessories manufacturing companies. At night the exhibit building will be illuminated by an animated sign 65 ft. in length and a fixed electric sign 290 ft. long, one of the largest signs of its kind in the world.

A. E. Allen Now Vice-President of Lamp Works

Arthur E. Allen was elected a vice-president and a member of the board of directors of the Westinghouse Lamp Company, New York, N. Y., at a meeting of the board of directors held April 7. Mr. Allen will replace T. G. Whaling, who died recently. Prior to taking over his new duties, Mr. Allen was general manager of the Westinghouse Lamp Company. He has long been affiliated with the Westinghouse Electric & Manufacturing Company, having entered the employ of that concern at the Newark works in 1902, subsequently being placed in charge of the test department. Later he became manager of the supply department of the New York sales offices, then executive assistant of the manager and then manager of the New York district sales office. In April, 1925, he was made general manager of the lamp company.

Rolling Stock

Altoona & Logan Valley Electric Railway, Altoona, Pa., has purchased five buses from the Yellow Truck & Coach Company, Chicago, Ill.

Key System Transit Company, Oakland, Cal., has placed an order with the Differential Steel Car Company of Findlay, Ohio, for ten Differential cars. Six of these will be motored and four trailers.

Boston Elevated Railway, Boston, Mass., has added five city type Mack buses to its large bus fleet. The new equipment will operate at a 6-cent fare on the 2-mile Brooks Street route.

Miami Beach Railway, Miami, Fla., has just received four six-cylinder gas-electric buses from the Fageol company, Kent, Ohio. Electrical equipment for these units was supplied by the General Electric Company.

Boston Elevated Railway, Boston, Mass., has recently purchased six Differential Cars from the Differential Steel Car Company of Findlay, Ohio. These cars will all be motor cars and will be equipped with Westinghouse HL control.

Interborough Rapid Transit Company, New York, N. Y., has been ordered by the New York Transit Commission to buy 382 new cars, costing about $10,000,000. This is part of a general order looking toward an increase in the facilities of the company. In defraying the cost of this program the city will participate under the dual rapid transit contracts. The company expects to appeal from the order to the members of the incoming commission, just appointed by the Governor.

Boston Elevated Railway, Boston, Mass., has ordered 100 new cars for use in main line elevated service. Of this total, 75 will be built by the Wason Manufacturing Company, Springfield, Mass., and 25 by the Laconia Car Company, Laconia, N. H. Delivery of the units will be made at a rate of two per week beginning Nov. 26, 1926. Many of the details of the new units have yet to be decided upon and orders for much of the equipment remain to be placed. Some of the principal specifications are available, however, and are given here:

Seating capacity	44
Bolster centers, length	32 ft., 3½ in.
Length over all	46 ft., 7¼ in.
Truck wheelbase	6 ft., 0 in.
Width over all	8 ft. 7½ in.
Height, rail to top	12 ft. 9⅞ in.
Body	All steel
Interior trim	Steel
Headlining	Agasote
Roof	Combination
Couplers	Tomlinson
Curtains	None
Destination signs	Electric Service Supplies
Energy-saving device	Rico coasting clocks
Journal bearings	Plain
Journal boxes	Cast steel
Motors, Two Westinghouse 301, inside hung	
Trucks	motor, Baldwin; trailer, Taylor
Wheels	34 in. and 31 in.

Aurora, Elgin & Fox River Electric Company, Aurora, Ill., has just ordered eight safety cars from the St. Louis Car Company, St. Louis, Mo. One Fageol bus, equipped with Westinghouse air brakes, was also purchased.

Twin City Rapid Transit Company, Minneapolis, Minn., is now building a new type of two-car train for use in St. Paul and Minneapolis. If the experimental service of the first train is satisfactory, this type will be the basis for future replacements and expansions of equipment in the Twin Cities.

Track and Line

Madison Railways, Madison, Wis., will rebuild all of its tracks around Capitol Square on Mifflin Street, Carroll, West Main and Pickney Streets. The tracks will be raised and a new concrete base will be laid preparatory to the city repaving these streets.

Des Moines City Railway, Des Moines, Iowa, plans to lay new track within the coming twelve months at a cost of between $30,000 and $40,000. The extension will be more than 1 mile long. A ten-year fight has been waged over the location of the extension.

Power Houses, Shops and Buildings

Louisville, Ky.—Work is to start this spring, it is understood, on the proposed new consolidated interurban station to be used by the Louisville & Interurban Railroad, a suburban division of the Louisville Railway, and also the Interstate Public Service Company, operating the lines between Louisville and Indianapolis. The new station will cost about $500,000. When the new building is completed the two present interurban stations will be abandoned. The new quarters will house all offices and operating departments. Land for the new station was bought two or three years ago, but building has been held up on account of financial conditions.

Public Service Railway, Newark, N. J., through its bus subsidiary, the Public Service Transportation Company, is erecting a garage at Turnerville, N. J., to house the buses that operate in South Jersey. The garage will front 300 ft. along the Black Horse Pike.

Trade Notes

Watson-Stillman Company announces that on and after May 1, 1926, its main offices and sales department will be located in the Evening Post Building, 75 West Street, New York, N. Y.

Gould Car Lighting Corporation, Baltimore, Md., has filed a certificate in the office of the Secretary of State to allow it to do business in New York State. It is capitalized with 10,000 shares of no par value. Its New York office is located at 250 Park Avenue.

Leon L. Wolf Waterproof Fabric Company, Cincinnati, Ohio, announces that new shades of Kemi-suede have been produced and are now ready for the market. Blue, green, maroon, black and nut brown have been added to the line, along with dark fawn, light fawn, blue gray, mixed gray, buckskin and neutral gray. Among the railways which have specified Kemi-suede are those in Cleveland, Milwaukee and Grand Rapids.

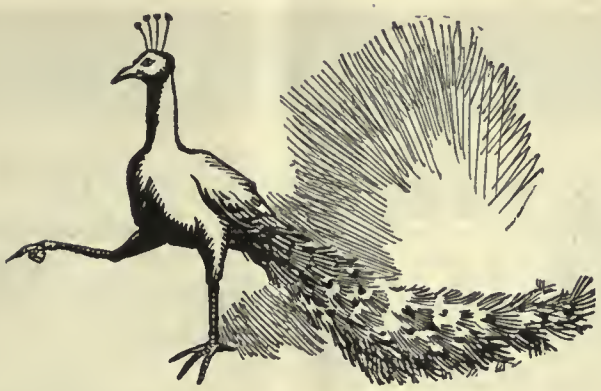
National Railroad Trolley Guard Company, Olean, N. Y., has disposed of all of its stock and rights to the Ohio Brass Company, Mansfield, Ohio, and notice of the dissolution of the corporation has been filed with the Secretary of State. For some years prior to taking over the assets of the National Railroad Trolley Guard Company the Ohio Brass Company was the exclusive sales agent for the former concern.

New Advertising Literature

J. Rowland Bibbins, consulting engineer, Washington, D. C., has issued a leaflet giving two essential transit-traffic determinations, namely, renewal liability and the traffic-thoroughfare plan. Also, representative surveys of Philadelphia and Indianapolis are briefly sketched, and a number of factors in proper budget determinations are given.

Allen-Bradley Company, Milwaukee, Wis., has issued a leaflet illustrating its motor starters for all types of alternating-current motors.

Crouse-Hinds Company, Syracuse, N. Y., has issued a folder describing various types of condulets for grounding service wires and conduit systems. As stated in the folder, the importance of a well-grounded system with ground wires thoroughly protected from mechanical injury has been gaining rapid recognition and is now a requirement of the 1925 code of the National Board of Fire Underwriters. Type GC condulets are listed in addition to No. 2089.



Provide adequate protection for modern light-weight cars

To protect the investment called for in the modernization movement is merely common sense. One of the protective measures is to install dependable hand brakes on all the new cars—Peacock Staffless Brakes.

They develop tremendous braking power—1066 lbs. with a 16-in. handwheel and 2000 lbs. with a 20-in. wheel. Even though brake rigging may be loose and brake shoes worn Peacocks have ample chain-winding capacity—144 in.—to take in all the slack and set the brakes.

The minimum platform space required, the simplicity of operation and the low maintenance charges are other important factors that make Peacock Staffless Brakes an economical form of protection for modern light-weight cars.

Complete information sent on request.

National Brake Company, Inc.

890 Ellicott Square **Buffalo, N. Y.**

Canadian Representative:
Lyman Tube & Supply Co., Ltd., Montreal, Can.

Staff  less

Peacock Brakes

Bankers and Engineers

Ford, Bacon & Davis
Incorporated
Engineers
115 Broadway, New York
PHILADELPHIA CHICAGO SAN FRANCISCO

The J. G. White Engineering Corporation
Engineers—Constructors
Oil Refineries and Pipe Lines, Steam and Water Power Plants, Transmission Systems, Hotels, Apartments, Office and Industrial Buildings, Railroads.
43 Exchange Place New York

STONE & WEBSTER
Incorporated
EXAMINATIONS REPORTS APPRAISALS
ON
INDUSTRIAL AND PUBLIC SERVICE PROPERTIES
New York Boston Chicago

THE BEELER ORGANIZATION
ENGINEERS AND CONSULTANTS
Traction - Traffic - Equipment - Power Investigations
TRANSPORTATION, TRAFFIC, AND OPERATING SURVEYS
COORDINATING SERVICE—FINANCIAL REPORTS
APPRAISALS—MANAGEMENT
52 Vanderbilt Ave. New York

SANDERSON & PORTER
ENGINEERS
PUBLIC UTILITIES & INDUSTRIALS
Design Construction Management
Examinations Reports Valuations
CHICAGO NEW YORK SAN FRANCISCO

Byllesby Engineering & Management Corporation
231 S. La Salle Street, Chicago
New York San Francisco

ALBERT S. RICHEY
ELECTRIC RAILWAY ENGINEER
WORCESTER, MASSACHUSETTS
REPORTS - APPRAISALS - RATES - OPERATION - SERVICE

ENGELHARDT W. HOLST
Consulting Engineer
Appraisals Reports Rates Service Investigation
Studies on Financial and Physical Rehabilitation
Reorganization Operation Management
683 Atlantic Ave., BOSTON, MASS.

JAMES E. ALLISON & CO.
Consulting Engineers
Specializing in Utility Rate Cases and Reports to Bankers and Investors
1017 Olive St., St. Louis, Mo.

DAY & ZIMMERMANN, INC.
ENGINEERS
DESIGN - CONSTRUCTION - REPORTS
VALUATIONS - MANAGEMENT
NEW YORK PHILADELPHIA CHICAGO

STEVENS & WOOD
INCORPORATED
ENGINEERS AND CONSTRUCTORS
120 BROADWAY, NEW YORK
ENGINEERING CONSTRUCTION YOUNGSTOWN, O. FINANCING MANAGEMENT

WALTER JACKSON
***Consultant on* Fares and Motor Buses**
The Weekly and Sunday Pass—Differential Fares—Ride Selling
143 Crary Ave., Mt. Vernon, N. Y.

HEMPHILL & WELLS
CONSULTING ENGINEERS
Gardner F. Wells Albert W. Hemphill
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INVESTIGATIONS COVERING
Reorganization Management Operation Construction
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CONSULTING ENGINEERS
REPORTS ON
Public Relations Rates Operating Problems
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A. L. DRUM & COMPANY
Consulting and Constructing Engineers
VALUATION AND FINANCIAL REPORTS
RATE STUDIES FOR PRESENTATION TO PUBLIC SERVICE COMMISSIONS
CONSTRUCTION AND MANAGEMENT OF ELECTRIC RAILWAYS
230 South Clark Street, Chicago, Ill.
215 South Broad Street, Philadelphia, Pa.

McCLELLAN & JUNKERSFELD
Incorporated
ENGINEERING AND CONSTRUCTION
Examinations—Reports—Valuations
Transportation Problems—Power Developments
68 Trinity Place, New York
CHICAGO ST. LOUIS

Transmission Line and Special Crossing Structures, Catenary Bridges

WRITE FOR OUR NEW DESCRIPTIVE CATALOG

ARCHBOLD-BRADY CO.

Engineers and Contractors SYRACUSE, N. Y.

C. B. BUCHANAN, President — W. H. PRICE, JR., Sec'y-Treas. — JOHN F. LAYNG, Vice-President

BUCHANAN & LAYNG CORPORATION

Engineering and Management, Construction, Financial Repotrs, Traffic Surveys and Equipment Maintenance

BALTIMORE, 1904 Citizens National Bank Bldg. — Phone: Hanover: 2142 — NEW YORK, 49 Wall Street

THE P. EDWARD WISH SERVICE

50 Church St. NEW YORK — *Street Railway Inspection* DETECTIVES — 131 State St. BOSTON

When writing the advertiser for information or prices, a mention of the Electric Railway Journal would be appreciated.

Coin Counting and Sorting Machines

FARE BOXES

Lever-Operated and Slip Change Carriers. Tokens.

The Cleveland Fare Box Co.

Cleveland, Ohio

Canadian Cleveland Fare Box Co., Ltd., Preston, Ont.

A Single Segment or a Complete Commutator

is turned out with equal care in our shops. The orders we fill differ only in magnitude; small orders command out utmost care and skill just as do large orders. CAMERON quality applies to every coil or segment that we can make, as well as to every commutator we built. That's why so many electric railway men rely absolutely on our name.

Cameron Electrical Mfg. Co., Ansonia, Connecticut



Gets Every Fare

PEREY TURNSTILES or PASSIMETERS

Use them in your Prepayment Areas and Street Cars

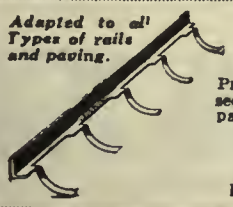
Perey Manufacturing Co., Inc.

101 Park Avenue, New York City

UNA RAIL BONDS-RAIL JOINTS DYNAMOTORS WELDING ROD

UNA Welding & Bonding Co. Cleveland, Ohio

Adapted to all Types of rails and paving.



GODWIN

Steel Paving Guards

Proved by service to economically prevent seepage and disintegration of street railway paving.

Write for Illustrated Catalog No. 20

W. S. GODWIN CO., Inc.

Race and McComas St., Baltimore, Md.

D-O-L-L-A-R-S

Mean Nothing!

---unless you know exactly what you get for them.

In using an accelerator, you may be *saving a little* on the cost of the material, and *wasting a lot* on labor in handling, errors in mixing, and inferior quality in results.



CAL is not only an accelerator in itself---but it permits a double acceleration by "fattening" the mix so that it can be handled easily with a smaller water content.

This "farter", dryer mix produces a vastly denser, harder, and more durable concrete.

CAL saves labor and mistakes by its very form -- it is a white, dry powder easily added by volume right at the mixer.

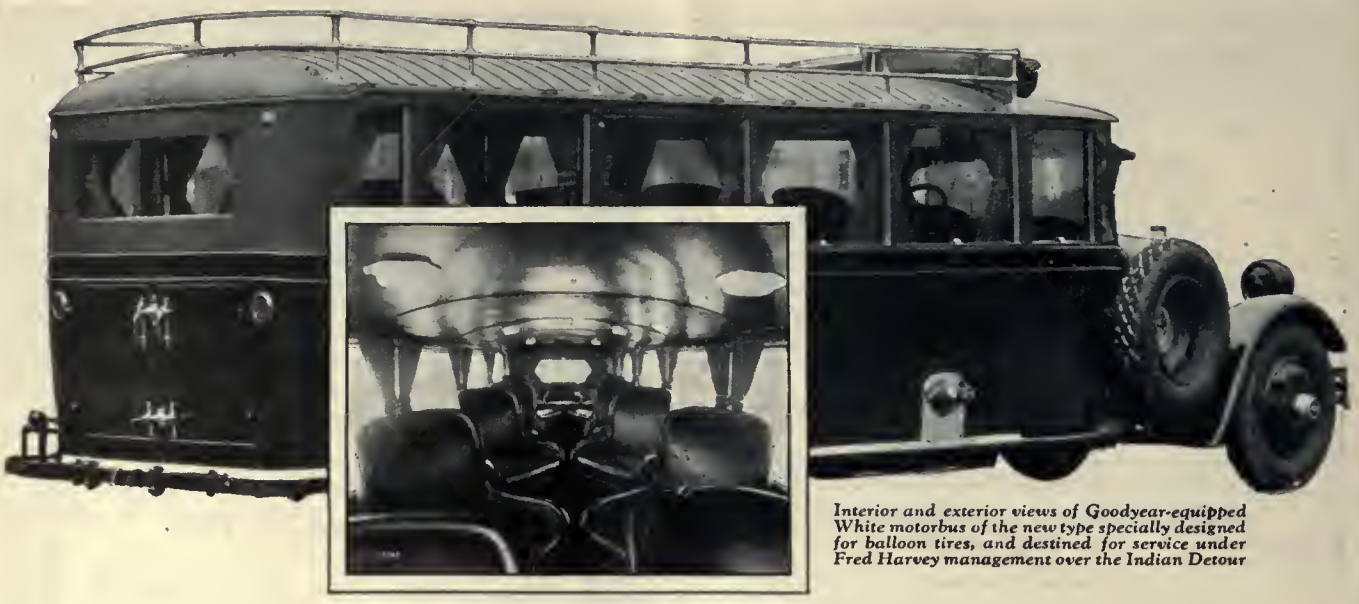
CAL costs more per pound than ordinary calcium chloride -- but *does more.* It *costs less* than other accelerators, does all that they do *and more.* INVESTIGATE!



Write for this free book

North American Cement Corporation

Hagerstown - - Md.



Interior and exterior views of Goodyear-equipped White motorbus of the new type specially designed for balloon tires, and destined for service under Fred Harvey management over the Indian Detour

What SUPERTWIST Adds to Goodyear Tires

YOU know what rugged strength and long life have always been built into Goodyear Pneumatic Bus Tires.

Now you may confidently expect even greater service from Goodyears in motorbus service, because Goodyear Pneumatic Bus Tires are now made with SUPERTWIST.

SUPERTWIST is the extra elastic, extra enduring new material specially developed by Goodyear for Goodyear balloon tires, motorbus and heavy duty cord tires.

It far outstretches ordinary cotton cord, and has a maximum flexing power that yields under impact, protecting the tire from rupture, stone bruise and other injuries. It thus insures virtually *double* the *carcass* life of the tire.

Other exclusive features of the Goodyear Pneumatic Tire construction for motorbus service are (1) the new Goodyear band-building method; (2) the new Goodyear breaker; (3) the new Goodyear bead—patent applied for, and (4) the famous All-Weather Tread.

These advantages you get only in Goodyear Pneumatic Bus Tires—the only motorbus tires made of SUPERTWIST.

They are real advantages, because they result in the utmost durability, tractive power, road safety, riding comfort, and long, trouble-free mileage at low cost.

Goodyear Means Good Wear

GOODYEAR

Copyright 1926, by The Goodyear Tire & Rubber Co., Inc.

"Brothers Under The Skin"

"RESEMBLANCE is an unmistakable sign of relationship." So say the biologists, but somehow we cannot agree. There is no physical resemblance whatsoever between a trolley car and a magazine. Yet both are *common carriers*. They are brothers under the skin.

The only *real* difference is that one carries passengers while the other carries stories, articles and advertisements.

If a passenger attempted to transport himself on foot, on horseback or by private automobile, he would find it more expensive than to travel on a railway. It is his willingness to travel in the company of others, thus sharing the expense, which makes railway transportation economical for individuals.

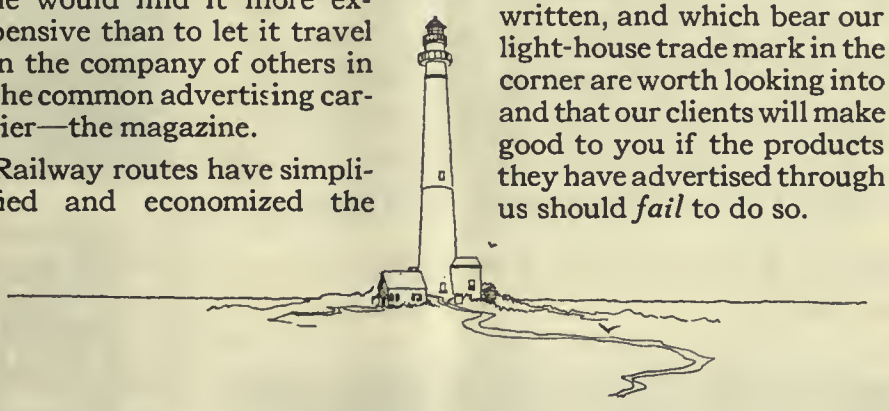
If an advertiser, similarly, tried to send his message individually to every buyer, he would find it more expensive than to let it travel in the company of others in the common advertising carrier—the magazine.

Railway routes have simplified and economized the distribution of human beings. Advertising routes have simplified and economized the distribution of the things that human beings buy.

Suppose, for instance, that an equipment manufacturer had produced a new car ventilator or car heater which he wanted to describe to railway officials. He could send his salesmen out to make some 750 individual calls. But he would find it both quicker and cheaper to place his message on board a common advertising carrier and let it travel out to you at a nominal cost per visit.

The advertiser or seller, moreover, is not the only one who benefits. Advertising reduces certain of the costs that make up price. The *buyer himself*, therefore, will find it economical to study and select from advertisements.

We can assure you that the advertisements we have written, and which bear our light-house trade mark in the corner are worth looking into and that our clients will make good to you if the products they have advertised through us should *fail* to do so.



Doyle, Kitchen & McCormick, Inc.
2 WEST 45th STREET, NEW YORK

An Advertising Agency



KELLY *heavy-duty* CORD

What Mr. Warner thinks of Kelly Heavy Duty Cords

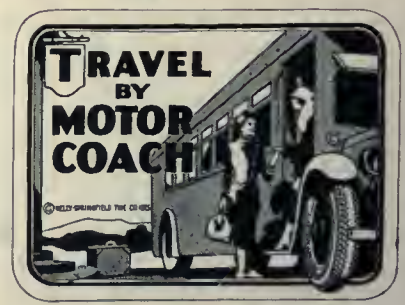
LIKE any other motor coach operator, the City Transit Co., Cincinnati, O., is interested in the service offered by different tires.

"Very naturally," writes Mr. C. S. Warner, President, "we have tried out several makes of tires. The photographs you have of our fleet will show that practically our entire equipment is on Kelly-Springfield Heavy Duty Cords. This, we think, would indicate what we think of your tires."

Mr. Warner is not alone in his discovery of the satisfactory service given by Kelly Heavy Duty Cords. Motor coach operators all over the country find Kellys so economical and so satisfactory that the number who are using them exclusively is growing continually.

KELLY-SPRINGFIELD TIRE CO.
250 West 57th Street New York, N. Y.





Motor Coach Operators—Advertise your business by affixing these attractively colored stickers to your passengers' baggage. We will gladly send you FREE as many as you can use.

Bus Companies Operating 10 or More White Busses

American Motor Tours Co	15
A. L. Ammen Transportation Co.	48
Benguet Auto Line	10
Blue Ridge Transportation Co	14
Bingham Stage Line	11
Boston Elevated Railway Co	80
Boston and Maine Railroad	15
Bardsleys Motors, Ltd.	27
Brewster Transportation Co., Ltd.	14
California Transit Co.	39
Carolina Transit Company	10
Casper Motor Bus Line	16
Chicago North Shore & Milwaukee R. R. Co.	19
Cleveland Railway Company	53
Cleveland, Ashtabula, Conneaut Bus Co.	35
Cleveland, Elyria, Toledo Bus Co.	12
Coleman and Clark	10
W. I. Coldiron	10
Columbia Stage Company	34
Comfort Coach Co., Ltd.	10
The Connecticut Company	23
Connecticut Motor Transportation Co.	16
Copper Range Motor Bus Co.	11
Daytona Shores	10
Denver Cab Company	12
G. T. Elliott	12
Emerick Motor Bus Company	10
Florida Motors Line Inc.	39
Fujiya Hotel Garage	11
Fullington Auto Bus Company	13
Garfield-Passaic Transit Co.	18
Glacier Park Transportation Co.	48
Gloucester Auto Bus Company	21
Golden State Auto Tours Corp.	12
Grays Harbor Ry. & Power Co.	10
Gulf Coast Motor Lines	10
Fred Harvey	31
Hileah-Allpattah Bus Line	18
Hollywood Land & Water Co.	61
Hong Kong Hotel Co., Ltd.	11
Illinois Power & Light Corp.	17
Independent School Dists. (Minn.)	30
Interstate Public Service Co.	12
Interurban Transportation Co.	11
Iron Range Transportation Co.	15
Johnson Bus Lines, Inc.	10
Jefferson County, Ala. Bd. of Education	32
Kern County, (California)	26
Leyte Land Transportation Co.	14
Lakewood Development Corp.	15
Longview Public Service Co.	14
Louisville Railway Co.	12
George E. Marsters, Inc.	10
McMahon Transportation Co.	22
George E. Merrick (Coral Gables Corp.)	47
Mesaba Transportation Co.	20
Middlesex & Boston Street R. R.	32
Milwaukee Elec. Ry. & Lt. Co.	67
Motor Bus Co. (Chippewa Falls, Wisc.)	10
Motor Transit Company	117
Newman Brothers	10
New England Transportation Co.	11
Northern Ohio Traction & Light Co.	96
Northland Transportation Co.	43
Original Stage Line	12
Pacific Electric Railway Co.	80
Park Auto Transportation Co.	13
Peninsula Rapid Transit Co.	28
The P. and O. Coach Lines	50
Pioneer Tourist Coaches, Ltd.	10
D. Peters	19
Pike's Peak Auto Highway Co.	12
Public Service Transportation Co.	108
Puyallup—Tacoma Transit Co.	23
Puget Sound Electric Railway Co.	12
Puget Sound International Ry. & Pr. Co.	11
Queens Bus Line Company	55
Rainier National Park Co.	24
Richmond Rapid Transit Co.	20
Rocky Mountain Parks Trans. Co.	82
Saginaw Transit Company	10
St. Louis Bus Company	34
Salt Lake Transportation Co.	25
San Francisco Municipal Ry.	11
S. R. P. & S. Auto Stage Co.	15
Seminole Sightseeing Service	14
Sioux Falls Traction System	12
Spokane, Portland & Seattle R. R.	30
F. H. Stewart	36
*Stone & Webster Interests	13
Teche Transfer Company	33
Twin City Motor Bus Company	41
Tokyo Shigai Jidosha Co.	65
Union Auto Transportation Co.	19
United Automobile Services, Ltd.	40
United Elec. Rys. Co. (Providence)	24
United Transportation Co.	10
United Rys. & Elec. Co. (Baltimore)	18
Virginia Electric & Power Co.	13
Washington Railway & Elec. Co.	11
White Transit Co., Inc., Plymouth, Pa.	40
White Transit Co., Ltd., Sydney, Australia	13
Wisconsin Power & Light Co.	10
Wood River & Alten Bus Lines	13
Yellowstone Park Transportation Co.	301
Yosemite National Park Co.	40
Youngstown Municipal Ry. Co.	40
Zamboanga Transportation Company	18
Total	3080

*Exclusive of subsidiary or affiliated companies individually listed.



White Model 50-B Bus—25 to 29 Passengers

108 Bus Companies Operate 3080 White Busses in Fleets of 10 or More

Successful bus operators must have dependable and economical equipment. Competition compels it. Scores of the leading bus operators of the United States and Canada have standardized on White Busses. They buy Whites year after year. They don't guess. They know bus value. . . . They know that White Busses can be depended upon for uninterrupted transportation over hundreds of thousands of miles.

Convincing evidence of satisfactory White Bus performance is offered in the accompanying list of 108 bus companies operating 3,080 White Busses in fleets of 10 or more. Hundreds of other bus companies operate Whites in fleets of less than 10.

There are more than 7,500 White Busses on the road—far more than any other high-grade make.

Let us send you free the 1926 White Roll Call Booklet listing 961 concerns in all lines of business operating 35,755 Whites in fleets of 10 or more. Address Room 20.

THE WHITE COMPANY
CLEVELAND

WHITE BUSSES

MADE RIGHT — SOLD RIGHT — KEPT RIGHT

67½% Less Vibration

On Buses equipped with "Gruss Twins"

Actual test with Vibrometer proves Gruss Air Springs accomplish amazing results

RECENTLY an actual vibrometer test was made to find out just how greatly Gruss Air Springs reduce vibration due to road shock on buses.

This test was made on two buses of the same model during their regular run. Bus A was Gruss equipped. Bus B was not.

Both buses traveled over the same route. Normal loads were carried. Schedule rate of speed was maintained.

Readings of the vibrometer showed that when partially loaded vibration in Bus A, Gruss equipped, was 52½% less than in Bus B, not Gruss equipped.

Results were even more startling when buses were fully loaded! In that case vibration in the Gruss equipped bus was 67½% less than in the bus without Gruss protection.



You know the toll vibration takes in breakage; the repair bills and lost operating time due to lay-ups that it is responsible for.

Then why not reduce this vibration and the expense it causes you? Why not make your buses so comfortable to ride in that the comfort itself causes comment among the passengers and increases patronage? Why not get the longer life from your buses and the greater tire mileage that is affected by air cushioning your buses with the Gruss Twins?

Today hundreds of bus operators are cutting their maintenance costs and building patronage with Gruss Air Springs.

We'll be glad to give you details in person at your convenience.

THE CLEVELAND PNEUMATIC TOOL CO., CLEVELAND, O.
Distributors and Service Stations in Principal Cities

GRUSS AIR SPRINGS

for Trucks, Buses Passenger Cars ~





The construction of Gibraltar Bodies has been particularly gratifying. Against all competition, they have stood the test in that great proving ground, the routes of the Detroit Motorbus Company. Security to passengers, comfort, clear vision, low initial and maintenance cost have been responsible for this enviable reputation.

The AUTO BODY Co.

LANSING MICHIGAN

Designers and Manufacturers of Motor Coach and Bus Bodies, Open and Enclosed Automobile Bodies

Gibraltar Bodies

Trademark Registered in United States and Canada. Applied for in foreign countries



Strength Comfort Appearance

Time does Tell



26 years of Satisfactory Ohmer Service

Of the hundreds of electric railway companies now using Ohmer Fare Registers, *one hundred and forty-eight* companies have used them continuously for periods varying from ten to twenty-six years.

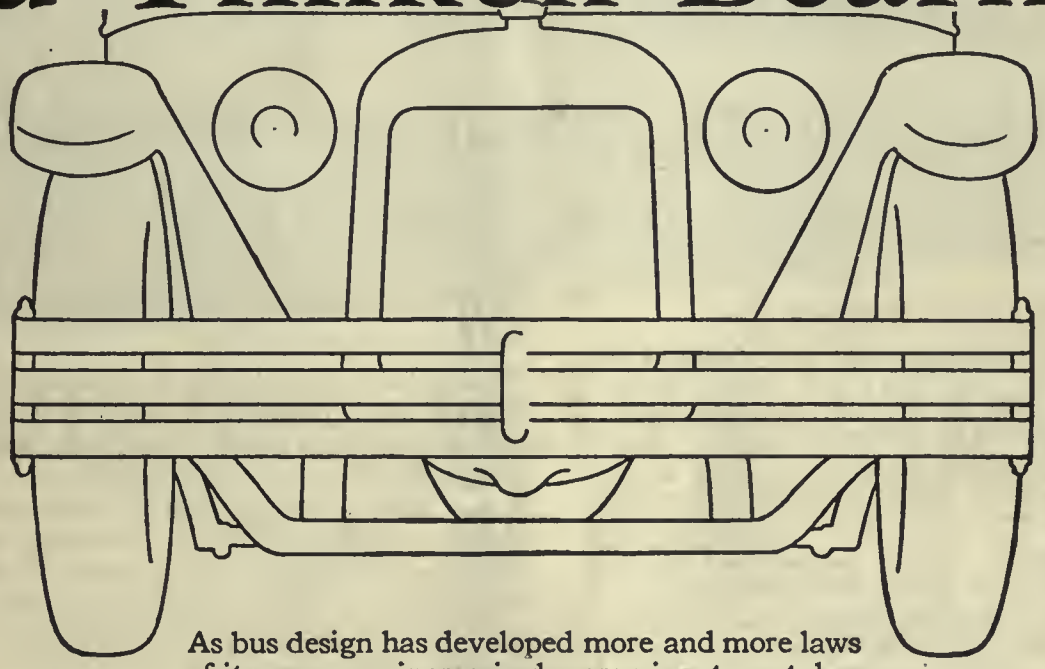
It is the usual thing for companies which once fully adopt the Ohmer System of fare protection to appreciate its value and stick to it. Of course, exactly the same Ohmer Fare Registers have not been used all through the years because our customers have been supplied with improved devices from time to time to mark the changing need but it was the OHMER SYSTEM OF FARE PROTECTION all the time. Changing types of cars never changed the basic principles involved in selling a ride.

If you are not entirely satisfied that your fare control is giving to you the maximum of cash or its equivalent returns, we would like to be given an opportunity to demonstrate on one of the lines of your property just what the Ohmer System means to the company using it.

OHMER
REG. U.S. PAT. OFF.
FARE REGISTERS

OHMER FARE REGISTER COMPANY
DAYTON, OHIO, U. S. A.

Longer and Lower and Timken Bearings



As bus design has developed more and more laws of its own, an increasingly prominent part has been awarded to Timken Bearings.

With road clearance a matter of almost micrometer dimensions, Timken Tapered Roller Bearings are contributing the invaluable properties of peak bearing capacity in minimum mounting space. Timken Taper, Timken positively aligned rolls, and Timken-made electric steel carry higher thrust, shock and radial loads without excessive diameter or supplementary parts.

Housings can therefore be much more compact, which favors low suspension, lighter weight, simplicity, accessibility and strength.

Since load capacity means endurance, Timken Bearings improve operating economy as well as design. This is so well established that bus manufacturers are virtually unanimous in their preference for Timkens. For example, at the last exhibition of buses before the experts of the American Electric Railway Association there were 92 Timken-equipped buses, of 93 exhibited!

THE TIMKEN ROLLER BEARING CO., CANTON, OHIO

TIMKEN *Tapered Roller* **BEARINGS**



Youngstown and Suburban Railway Cars built by G. C. Kuhlman Car Company with HASKELITE roofs and PLYMETL Side Panels.

The HASKELITE-PLYMETL Car is Modern In Appearance as Well as in Light Weight

4 *Ways to Improve the Appearance of a Street Car*

1. PLYMETL Side Panels take a beautiful finish with few coats of paint.
2. HASKELITE headlinings or roofs with headlinings eliminated improve the inside appearance of the car.
3. HASKELITE floors can easily be kept in repair and present an excellent appearance.
4. No more beautiful panelling or interior trim is available than HASKELITE.

MODERNIZE your equipment!—Everybody is trying to do it.

That means improve its appearance so you will attract more passengers, and cut the operating cost so you can make a profit on the business. HASKELITE and PLYMETL fit into both these plans. You probably know the achievements of these materials in cutting weight and thereby reducing operating costs. Note the four ways they definitely improve appearance. You can get both these big advantages in your cars at a cost actually less than for the old antiquated type of construction.

Ask for our Blueprint Booklet containing complete data on HASKELITE and PLYMETL for street car use.

Haskelite Manufacturing Corp.
133 W. Washington St., Chicago



York Railway Cars built by The J. G. Brill Co., are typical of results possible through the use of these light-weight materials.

HASKELITE and PLYMETL

Champion Light-weight Pair; Ideal for transportation,—water, land or air.

PLYMETL



MODERN ROLLING STOCK
pays for itself!

Figures are available to prove it. More inviting in appearance, more comfortable to ride in, making faster trips and shorter stops, the modern car creates increased patronage and reduces the competition of the private automobile. It builds revenue.

Lighter and faster, it operates at less cost and entails lower maintenance expense.

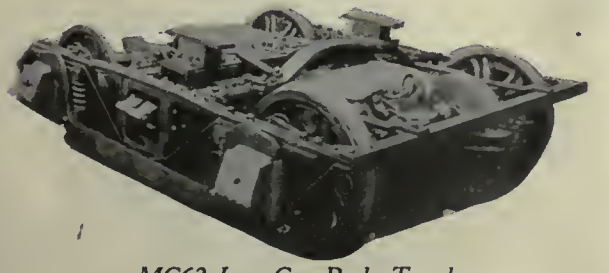
By increasing revenue and reducing costs, the new car pays for itself in a very few years.

Our engineers are thoroughly conversant with the modern features of car design and construction. Let them co-operate with you in working out plans for your projected new equipment—or we will quote on your specifications.

Cummings Car and Coach Co.

Successors to McGuire Cummings Mfg. Co.

111 W. Monroe Street, Chicago, Illinois



MC62 Low Car Body Truck

LIGHT WEIGHT, SINGLE AND DOUBLE TRUCKS

SNOW SWEEPERS AND PLOWS

GAS-ELECTRIC MOTOR COACHES

BRILL

It

Put the railway in the headlines—favorab



Criticism, complaints and abuse in the public press is hard enough to endure at any time. And when there's never anything else, it is indeed a discouraging situation.

Yet the newspapers, as a rule, will print favorable news—if it is news! The advent of new and improved cars, or the inauguration of faster schedules, and similar events, are news items of interest and will be published.

can be done with *new* cars!

Philadelphia has done it! So has Brooklyn!

The leading metropolitan dailies have given generous publicity to the new cars, and to other modern innovations of these progressive properties. But notice, please, that the Philadelphia Rapid Transit and the Brooklyn City Railroad have thoroughly modernized their rolling stock, and that these cars make schedule speeds which are close to the top of the list for city service.

Increased patronage invariably rewards such service. And with it come the benefits of lower operating and maintenance costs inherent in truly modern, Brill-built cars.

Give the newspapers a chance also to carry the good news of increased earnings and dividend payments on the financial pages. It can be done—with new, efficient, modern Brill-built cars.

THE J. G. BRILL COMPANY
PHILADELPHIA, PA.
AMERICAN CAR CO. ST. LOUIS, MO. — G. C. KUHLMAN CAR CO. CLEVELAND, OHIO. — WASON MANF'G CO. SPRINGFIELD, MASS.





DERRICK cars like this, carrying heavy weights and subject to unusually severe service, require sturdy wheels.

"STANDARD" Rolled Steel Wheels are used on *this* Chicago, North Shore & Milwaukee work car.

Rolled Steel Wheels
Quenched and Tempered Carbon Steel Axles
Coil and Elliptic Springs

STANDARD STEEL
WORKS COMPANY
PHILADELPHIA, PA.

BRANCH OFFICES:

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NEW YORK	SAN FRANCISCO	LOS ANGELES, CAL.
HOUSTON, TEXAS	BOSTON	MEXICO CITY, MEX.

WORKS: BURNHAM, PA.



Have You a Copy?

Mail the COUPON NOW

Carnegie Steel Company has just issued a new revision of the booklet—"Steel Cross Ties." It is illustrated with photographs of interesting installations of street railway track and contains data of value to railway operators. Steel cross ties are now being used in practically all new work where economy and permanency are the chief considerations. If you are interested in "low-maintenance-cost" track, cut out the coupon and mail it today. There is, of course, no obligation involved.

1811

Carnegie Steel Company
431 Carnegie Building,
Pittsburgh, Penna.

Send me a copy of your new booklet—"Steel Cross Ties."

Name.....

Street.....

City.....

State.....

GOOD-

Just about Determines the

How much has the private auto cut into your traffic?

How much does it cost you to finance? Will your customers buy your stock?

Are the people for or against you in legal matters?

All this is important. All are largely matters of GOOD-WILL. Read on.



The Dayton Mechanical
DAYTON,

WILL

Earning Power of a Street Railway

IF people would rather ride your railway than any other transportation medium (including their own autos); if they thought well enough of it to buy stock when financing became necessary; and if they solidly supported you with their favorable opinion in legal matters; what a tremendous sum that would represent in good-will, and what an effect it would have on your balance sheet.

IN the cultivation of good-will quiet, smooth operation plays a most important part. People unconsciously come to approve a railway that is quiet and comfortable.

DAYTON TIES with their exclusive wood-block and asphalt cushion construction preserve indefinitely a smooth track surface by absorbing the shocks and vibration that would break down the track foundation. The vibration absorption also gives a noteworthy quietness of operation and keeps your rolling stock in better condition.

SERIOUS consideration of this will repay you many times. The value of good-will you will have to estimate yourself, but we will gladly furnish you with every detail of construction, cost, and service.



NEW RAILS AND TRACK MATERIALS



Foster Supplies regularly, New Steel Rails and Track Accessories for Complete Installations and for Repairs or Extensions, to many of the largest Electric Railroads in this country—with complete satisfaction as to QUALITY, SERVICE and GUARANTEE.

"PRICES,"—well, just ask for them—"1 Ton or 1,000."

L·B·FOSTER COMPANY

PITTSBURGH · CHICAGO · NEW YORK

Who Invented the Wheel?

It is generally agreed by students of the history of civilization that that man did more for material progress than any other man could possibly have done. The wheel is the fundamental element in every vehicle of transportation.



Making Chariot Wheels in Egypt, about 1500 B.C.— From a tomb near Thebes

COST LESS PER TON MILE

=

THEY CARRY A SERVICE GUARANTEE

=

THE HARD TREAD AND FLANGE HAS A MAXIMUM WEARING VALUE



The Standard Wheel for 74 Years

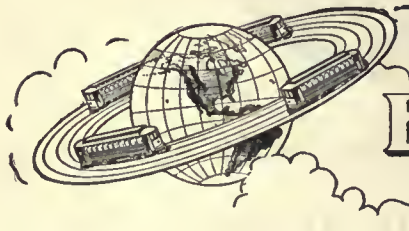
A.R.A. Standards

650 lb. Wheel for 30 Ton Cars
700 lb. Wheel for 40 Ton Cars
750 lb. Wheel for 50 Ton Cars
850 lb. Wheel for 70 Ton Cars

ASSOCIATION OF MANUFACTURERS OF CHILLED CAR WHEELS
1847 McCormick Building
CHICAGO

50 Plants—Daily Capacities 20,000 Wheels

The creation and maintenance of car advertising space values requires the same degree of highly specialized knowledge as the construction and maintenance of railroads. Such tasks should be delegated only to those of widest experience and longest record of success.



Barron G. Collier
INCORPORATED
CANDLER BLDG. NEW YORK



TEXACO

The Chosen Lubricant of ELECTRIC RAILWAYS

The Texas Company, U. S. A., 17 Battery Place, New York City

OFFICES IN PRINCIPAL CITIES

McGraw-Hill men studying your

How Many Trained Investigators

have you out in the field, gathering data on the industries which buy from you, studying the markets for your product from the standpoint of engineering fundamentals, sensing the coming shifts which may stimulate or depress your sales? . . . .Perhaps not one!

But if you should walk through the great editorial rooms of the McGraw-Hill Publications any morning, you would see many vacant desks of men who are "out in the field," rubbing elbows with their industries, getting data on trends and money-saving practices. They are primarily in the readers' service, but the data they gather are necessarily the basis of sound selling to their several industries. They are, therefore, in your service as well as that of the reader.

The McGraw-Hill Publications

MINING
ENGINEERING & MINING JOURNAL-PRESS
COAL AGE

ELECTRICAL
ELECTRICAL WORLD — JOURNAL OF ELECTRICITY
ELECTRICAL MERCHANDISING

INDUSTRIAL
AMERICAN MACHINIST — INDUSTRIAL ENGINEER
CHEMICAL & METALLURGICAL ENGINEERING
POWER

CONSTRUCTION & CIVIL ENGINEERING
ENGINEERING NEWS-RECORD

TRANSPORTATION
ELECTRIC RAILWAY JOURNAL
BUS TRANSPORTATION

RADIO
RADIO RETAILING

OVERSEAS
INGENIERIA INTERNACIONAL
AMERICAN MACHINIST
(European Edition)

DIRECTORIES & CATALOGS
CENTRAL STATION DIRECTORY — COAL CATALOG
ELECTRIC RAILWAY DIRECTORY
EMF ELECTRICAL YEAR BOOK
RADIO TRADE CATALOG
COAL FIELD DIRECTORY
KEYSTONE CATALOG (Coal Edition) — KEYSTONE CATALOG (Metal-Quarry Edition)
ANALYSIS OF NON-METALLIC MINING, QUARRYING AND CEMENT INDUSTRIES

The *American Machinist* editors are ever afield, gathering data, inspecting installations, studying operations and pointing the way to lower production costs through replacement of inefficient machinery.

Engineering News-Record editors four years ago started a campaign for winter construction to provide year-round contracts to the construction industry and ultimately reduce building costs. They have made frequent excursions to winter operations, bringing back to their publication and industry the facts regarding costs and benefits. Stability and expansion of the market for building equipment and supplies have already resulted.

Electrical World's editorial field investigations and statistical work have brought to central stations major policies and accurate data for the development of industrial heating and domestic load building, including refrigeration and cooking. On the other hand this service has supplied to electrical manufacturers accurate yardsticks for plotting sales quotas and future expansion. The public draws a by-product from this work in the form of (1) service at the same or lower rates, notwithstanding the increased cost of everything entering into the production of electricity; (2) extension of electric lines to isolated sections.

So with all McGraw-Hill Publications—editors leave their desks to discover and point the way toward bigger opportunity . . . . *Power* editors are effectively crusading for increased boiler efficiency through better equipment . . . . *Coal Age* editors are campaigning against obsolete methods in the mines and for cost-cutting machinery . . . . *Bus Transportation* editors have helped to bring order out of chaos in this *infant* industry, which today covers twice the mileage of the nation's railways . . . . In existence but a short year, *Radio Retailing* is bending every effort toward stabilizing and stimulating radio merchandising. Its costs studies on operating the four major types of stores and departments are the very first information of its kind in the radio field, paralleling the investigations made by McGraw-Hill in the general electrical merchandising field.

Each McGraw-Hill Publication lives the life and breathes the air of the industry it serves. Its experts are on the ground, getting first-hand information on the things they need to know to make the Publication the virile authority it is in its field. Through over fifty years of intimate contact such as this, the McGraw-Hill Publishing Company has acquired an unmatched knowledge of industry, a rich storehouse of information for the manufacturer who would sell to industry efficiently. This is the background out of which have come the McGraw-Hill Four Principles of Industrial Marketing.

are away markets



An Editorial floor and the mezzanine
New York Office
McGraw-Hill Publishing Company, Inc.

125 Editors drawn from industry and trade
542 Special News Correspondents
Editors travel 700,000 miles a year through industry
23,000 editorial pages printed yearly
10,000,000 copies of McGraw-Hill papers to 220,000 subscribers annually
Editorial offices located at 9 strategic centers

Sound, efficient sales effort in the field of Industrial Marketing must be based on these Four Principles:

Market Determination

An analysis of markets either by industries or buying groups such as "engineers" functioning through all industry.

Buying Habits

A study of the selected markets to determine which men in each industry are the controlling buying factors. Definite knowledge eliminates costly waste in sales effort.

Channels of Approach

Determination of the methods by which each market keeps in touch with developments and the employment of these methods as the channels of approach to these buyers. Proper use of these channels provides a balanced sales promotion program, making most effective use of publication advertising, manufacturers' literature and exhibits.

Appeals that Influence

Determining the appeals that will present the product to the prospective buyer in terms of his own self-interest or needs.

These Four Principles of Industrial Marketing can be made a living force in your business. The goal of American industry today is to make distribution as efficient as production. If this is *your* goal, get in touch with the nearest McGraw-Hill office, or have your advertising agent do so and arrange for a personal discussion with McGraw-Hill Marketing Counselors, in your office or in ours.

McGRAW-HILL PUBLISHING COMPANY, INC., NEW YORK, CHICAGO, PHILADELPHIA, CLEVELAND, ST. LOUIS, SAN FRANCISCO, LONDON

McGRAW-HILL PUBLICATIONS

45,000 Advertising Pages used Annually by 3,000 manufacturers to help Industry buy more effectively.

The first complete book on power-factor problems

A book you will want to have
Examine it for 10 days FREE.

Just Out!

POWER-FACTOR WASTES

By Charles R. Underhill
Consulting Electrical Engineer
326 pages, 6x9, illustrated, $3.50 net, postpaid

This book gives you a complete and practical discussion of power-factor wastes, their costs, causes and cures. It brings together for the first time the facts and authoritative opinions about this long-standing electrical problem.

The book analyzes the use of electric power in relation to the work it is supposed to do and the work it actually does, and explains the methods which have proved successful in reducing the obvious wastes and losses. Every side of the power-factor question is given adequate attention—corrective measures and machines are thoroughly described—possible savings are shown by actual figures from plant operation.



Some special topics discussed:

Symposium on the Power-Factor Situation.
Fundamental Principles of Power-Factor and Its Correction.
The Plant Distribution System. Power-Factor Correction with Fynn-Weichsel Motors.
Improving Power-Factor with Electric Furnace.
Status of Power-Factor Correction.

Examine the book FREE

The book presents the belief that low power factor is not a burden which the electrical industry and users of electric power must shoulder. You will be interested to know this book. Send for it to examine.

Be sure to see this new book

Mail just this coupon

McGRAW-HILL
FREE EXAMINATION COUPON

McGraw-Hill Book Co., Inc., 370 Seventh Avenue, New York.

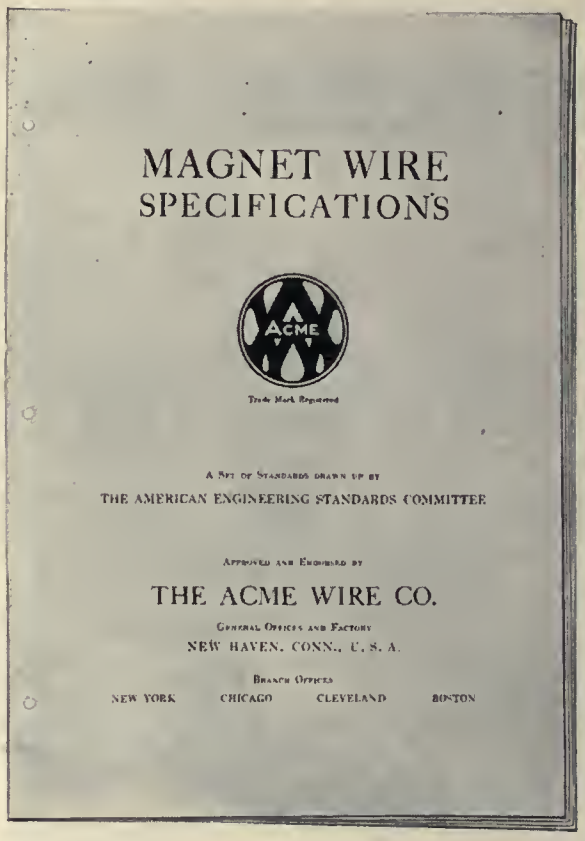
You may send me on 10 days' approval **Underhill—Power-Factor Wastes. $3.50 net, postpaid.** I agree to remit for the book or to return it postpaid within 10 days of receipt.

Signed .....

Address .....

Official Position .....

Name of Company .....
(Books sent on approval to retail purchasers in U. S. and Canada only.) E 5-1-26



This Specification

Should be in the hands of every manufacturer of electrical apparatus.

We will be glad to send a copy to any Engineer or Purchasing Agent who will write us for it.

Ask for Pamphlet No. 2-J.

THE ACME WIRE CO.
NEW HAVEN, CONN., U. S. A.
BRANCHES:
New York Chicago Cleveland Boston

ACME WIRE PRODUCTS

MAGNET WIRE COIL WINDINGS
ACME VARNISHED INSULATIONS

COMPRESSED TERMINAL RAIL BONDS



150 lb. Third Rail Joint bonded with 4—450,000 c. m. U. S. B. Bonds.

The above illustration shows an unusual view of four tangent tracks on the Long Island Railroad.

Compressed Terminal Third Rail Bonds made by the American Steel & Wire Company were selected for use on the heavily traveled extension to Babylon.

The permanence of the compressed terminal contact has been proven. Bonds placed in service during 1910 showed no increase in resistance when tested recently.

Specify American Steel & Wire Company's Third Rail Bonds.

MADE BY

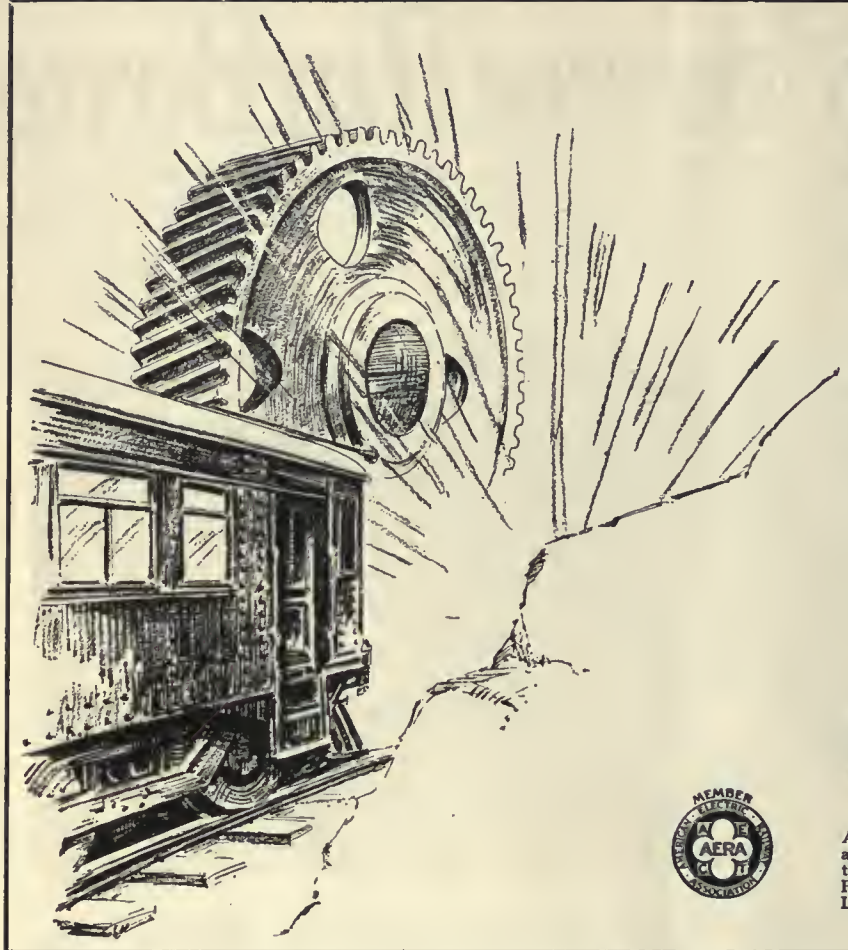
AMERICAN STEEL & WIRE Company

Sales Offices:

Chicago New York Boston Cleveland Worcester Philadelphia Pittsburgh Buffalo Detroit Cincinnati Baltimore Wilkes-Barre St. Louis Kansas City St. Paul Oklahoma City Birmingham Memphis Dallas Atlanta Denver Salt Lake City

Export Representative: U. S. Steel Products Co., New York

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Nearly ¾ of a Million Miles

and apparently good for a million

ONE of the first Nuttall Heat Treated Helical Gears ever installed is still running, and is apparently good for an indefinite life.

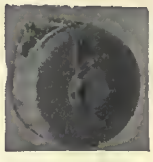
DO YOU get that sort of service from the gears you buy?

Nuttall BP Helical Gears are saving most of their cost on many properties, just due to minimizing vibration.

Write for Bulletins giving full details

R.D.NUTTALL COMPANY
PITTSBURGH PENNSYLVANIA

All Westinghouse Electric & Mfg. Co. District Offices are Sales Representatives in the United States for the Nuttall Electric Railway and Mine Haulage Products. In Canada: Lyman Tube & Supply Co., Ltd., Montreal and Toronto.



Complete satisfaction

Operating perfectly and requiring minimum attention for maintenance and lubrication, Earll Catchers and Retrievers give genuinely satisfactory results. Their refinement of design, and mechanical superiority are summarized in the following five features, peculiar to Earll construction.

No-wear Check Pawl
Free-Winding Tension Spring
Ratchet Wind
Emergency Release
Perfect Automatic Lubrication

Earll Catchers and Retrievers

C. I. EARLL, York, Pa.

Canadian Agents:
Railway & Power Engineering Corp., Ltd., Toronto, Ont.
In All Other Foreign Countries:
International General Electric Co., Schenectady, N. Y.

PERFECT
MICANITE
INSULATOR
Reg. U. S. Pat. Off.

ELECTRICAL INSULATION

Micanite armature and commutator insulation, commutator segments and rings, plate, tubes, etc., Empire oiled insulating materials; Linotape; Kablak; Mico; and other products—for the electrical insulating requirements of the railway.

Catalogs will gladly be furnished

MICA INSULATOR COMPANY
Sole Manufacturers of Micanite
Established 1893

68 Church St., New York 542 So. Dearborn St., Chicago
Works: Schenectady, N. Y.

8-F



STANDARD Magnet Wire
Round, Square, Flat
Single, Double, Triple Cotton Covered

is made from the highest conductivity, soft drawn (annealed) copper, and carefully inspected at every stage of manufacture from wire bar to finished product.

Special kinds of wire to meet particular needs can be supplied promptly.

Write our nearest office

Standard Underground Cable Co.

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For Canada: STANDARD UNDERGROUND CABLE CO., OF CANADA, LIMITED, HAMILTON, ONT.

PANTASOTE

Trade Mark

Seat and Curtain Materials

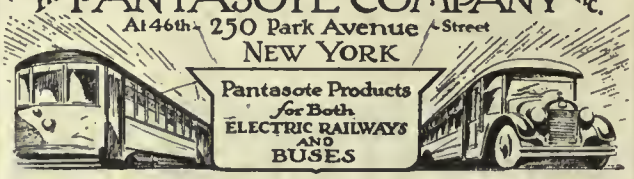
AGASOTE

Trade Mark

Roofing—Headlining—Wainscoting

standard
for electric railway cars
and motor buses

The PANTASOTE COMPANY Inc.
At 46th St. 250 Park Avenue
NEW YORK



82% use "Tool Steel" gears.

The A. E. R. A. Equipment Committee—1924-1925

THE 1924-1925 A. E. R. A. Equipment Committee consisted of 14 railway men representing many of the large and aggressive companies. Their companies controlled a total of 16,992 cars. The line-up regarding their use of "Tool Steel" gears is as follows:

Exclusive Users—6 companies controlling 8003 cars.....47%	82%
Part Users—5 companies controlling 5971 cars.....35%	
Companies Testing—1 company controlling 1435 cars.....9%	
Non-Users—2 companies controlling 1583 cars.....9%	

Remember, the companies in this tabulation were selected by the A. E. R. A. as the live wires on equipment. They certainly know quality when it comes to gears.

The Tool Steel Gear & Pinion Co.,
Cincinnati, Ohio





R 11 Double Register

Both our latest single and double registers are now equipped for electric as well as mechantcal hand or foot operation.

Full Electric Operation of Fare Registers

A completely satisfactory fare registration system is one that has the confidence of the public, the conductor and the accounting department. The simplicity and accuracy of International Registers maintained for more than thirty years, is combined in the later types with the extra speed and convenience of electric operation.

The International Register Co.
15 South Throop St., Chicago

AMERICAN BRIDGE COMPANY

EMPIRE BUILDING—71 BROADWAY NEW YORK, N. Y.

Manufacturers of Steel Structures of all classes particularly BRIDGES AND BUILDINGS

ALSO STEEL BARGES FOR HARBORS AND RIVERS, STEEL TOWERS FOR ELECTRIC TRANSMISSION, HEROULT ELECTRIC FURNACES, ETC.

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PITTSBURGH, PA. — Cincinnati, Ohio — Cleveland, Ohio — Detroit, Mich.

CHICAGO, ILL. — St. Louis, Mo. — Denver, Colo. — Salt Lake City, Utah — Duluth, Minn. — Minneapolis, Minn.

Pacific Coast Representative: U. S. Steel Products Co., Pacific Coast Dept. — San Francisco, Cal. — Los Angeles, Cal. — Portland, Ore. — Seattle, Wash.

Export Representative: United States Steel Products Co., 30 Church Street, New York.

Bethlehem Products for Electric Railways

Tee and Girder Rails; Machine Fitted Joints; Splice Bars; Hard Center Frogs; Hard Center Mates; Rolled Alloy Steel Crossings; Abbott and Center Rib Base Plates; Rolled Steel Wheels and Forged Axles; Tie Rods; Bolts; Tie Plates and Pole Line Material.

Catalog Sent on Request

BETHLEHEM STEEL COMPANY, Bethlehem, Pa.

BETHLEHEM

WHARTON

Special Trackwork
Switches-Mates-Frogs-Crossings
incorporating the famous
Tisco Manganese Steel

Wm. Wharton Jr. & Co., Inc.
Easton, Pa.
Offices
Boston Chicago El Paso Montreal New York Philadelphia
Pittsburgh Salt Lake City San Francisco Scranton

The DIFFERENTIAL CAR



Standard on 60 Railways for

Track Maintenance
Track Construction
Ash Disposal
Coal Hauling
Concrete Materials
Waste Handling
Excavated Materials
Hauling Cross Ties
Snow Disposal

Use These Labor Savers

Differential Crane Car
Clark Concrete Breaker
Differential Bottom Dump Ballast Car
Differential Car Wheel Truck and Tractor

THE DIFFERENTIAL STEEL CAR CO., Findlay, O.



The Hardware makes the line Hubbard makes the Hardware

HUBBARD

Hubbard and COMPANY

PITTSBURGH • OAKLAND, CAL. • CHICAGO

Lorain Special Trackwork Girder Rails

Electrically Welded Joints

THE LORAIN STEEL COMPANY
Johnstown, Pa.

Sales Offices:
Atlanta Chicago Cleveland New York Philadelphia Pittsburgh Dallas

Pacific Coast Representative:
United States Steel Products Company
Los Angeles Portland San Francisco Seattle

Export Representative:
United States Steel Products Company, New York, N. Y.

SEARCHLIGHT SECTION

USED EQUIPMENT & NEW—BUSINESS OPPORTUNITIES

UNDISPLAYED—RATE PER WORD:

Positions Wanted, 4 cents a word, minimum 75 cents an insertion, payable in advance.

Positions Vacant and all other classifications, 8 cents a word, minimum charge $2.00.

Proposals, 40 cents a line an insertion.

INFORMATION:

Box Numbers in care of any of our offices count 10 words additional in undisplayed ads.

Discount of 10% if one payment is made in advance for four consecutive insertions of undisplayed ads (not including proposals).

DISPLAYED—RATE PER INCH:

1 to 3 inches.....$4.50 an inch
4 to 7 inches..... 4.30 an inch
8 to 14 inches..... 4.10 an inch

Rates for larger spaces, or yearly rates, on request.

An advertising inch is measured vertically on one column, 3 columns—30 inches—to a page.

ERJ

POSITIONS WANTED

GENERAL superintendent with 20 years' experience in the operation of both city and large interurban railway wishes to change location, can furnish very best reference. PW-891, Electric Railway Journal, 7 So. Dearborn St., Chicago, Ill.

SUPERINTENDENT transportation. With a wide experience and successful record on city and interurban properties also co-ordination of rail and bus service, successful in handling labor, public relations, etc. Recognized as a transportation official of exceptional ability fully capable of getting results on any property. At present engaged. Personal reasons for desiring change. Best of references. Correspondence invited. Address PW-903, Electric Railway Journal, Guardian Building, Cleveland, Ohio.

FOR SALE

30 Birney Safety Cars

Brill Built

West. 508 or G. E. 264 Motors. Cars Complete—Low Price—Fine Condition.

ELECTRIC EQUIPMENT CO.
Commonwealth Bldg., Philadelphia, Pa.

FOR SALE

200 Tons New Rail

Lorain Section, 7-in. 82-505 Standard Drilling. For price and further details write

Purchasing Agent
EAST ST. LOUIS & SUB. RY. CO.,
East St. Louis, Ill.

Rotary Converters

1—500 kw., 600-v., 833 amp., 900 r.p.m., 6-ph., compound wound Westinghouse Rotary Converter, with 3—165 kva., 60-cy., single ph., 13200 v. primary transformers with A.C. and D.C. panels.

1—300 kw., 600-v., 500 amp., 1200 r.p.m., 6-ph., compound wound interpole Westinghouse Rotary Converter, with 3—110 kva., 60-cy., single ph., 13200-v. primary transformers with A.C. and D.C. panels.

GEO. SACHSENMAIER CO.
926 N. Third St., Philadelphia, Pa.

"Opportunity" Advertising:

Think "*SEARCHLIGHT*" First!

TULC
A LUBRICANT

We make a specialty of

ELECTRIC RAILWAY LUBRICATION

We solicit a test of TULC on your equipment

The Universal Lubricating Co.
Cleveland, Ohio
Chicago Representatives: Jameson-Ross Company, Straus Bldg.

You're having brush trouble

CORRECT IT

USE LE CARBONE CARBON BRUSHES

They talk for themselves

COST MORE PER BRUSH
COST LESS PER CAR MILE

W. J. Jeandron
Hoboken Factory Terminal,
Building F, Fifteenth Street, Hoboken, N. J.

Pittsburgh Office: 634 Wabash Bldg.
Chicago Office: 1657 Monadnock Block

San Francisco Office: 525 Market Street

Canadian Distributors: Lyman Tube & Supply Co., Ltd., Montreal and Toronto

B. A. HEGEMAN, Jr., President H. A. HEGEMAN, First Vice-Pres. and Treas.
W. C. PETERS, Vice-Pres. Sales and Engineering F. T. SARGENT, Secretary

National Railway Appliance Co.

Grand Central Terminal, 452 Lexington Ave., Cor. 45th St., New York

Munsey Bldg., Washington, D. C. 100 Boylston St., Boston, Mass.
Hegeman-Castle Corporation, Railway Exchange Building, Chicago.

RAILWAY SUPPLIES

Tool Steel Gears and Pinions
Bell Locked Fare Box and Change Maker
The Aluminum Field Coils
Walter Tractor Snow Plows
Cutler-Hammer Electric Heaters
Genesco Paint Oils
Garland Ventilators
Flaxlinum Insulation
Yellow Coach Mfg. Co.'s Single and Double Deck Busses.
B. G. Spark Plugs
Economy Electric Devices Co.'s Power Saving and Inspection Meters
Anglo-American Varnish Co., Varnishes, Enamels, etc.
National Hand Holds
Ft. Pitt Spring & Mfg. Co., Springs
Anderson Slack Adjusters
Feasible Drop Brake Stalls
Dunham Hopper Door Devices

WHAT AND WHERE TO BUY

Equipment, Apparatus and Supplies Used by the Electric Railway Industry with Names of Manufacturers and Distributors Advertising in this Issue

Advertising, Street Car
Collier, Inc., Barron G.

Air Brakes
Westinghouse Air Brake Co.

Air Springs
Cleveland Pneumatic Tool Co.

Anchors, Guy
Elec. Service Supplies Co.
Ohio Brass Co.
Westinghouse Elec. & M. Co.

Armature Shop Tools
Elec. Service Supplies Co.

Asphalt Paint
American Asphalt Paint Co.

Automatic Return Switch Stand
Ramapo Ajax Corp.

Automatic Safety Switch Stands
Ramapo Ajax Corp.

Axles
Bethlehem Steel Co.
Brill Co., The J. G.
Carnegie Steel Co.
Johnson & Co., J. R.
National Ry. Appliance Co.
Standard Steel Works
Westinghouse Elec. & Mfg. Co.

Axles, Carbon Vanadium
Johnson & Co., J. R.

Axles, Steel
Bethlehem Steel Co.
Carnegie Steel Co.
Johnson & Co., J. R.
Ludlum Steel Co.

Babbit Metal
Johnson & Co., J. R.

Badges and Buttons
Elec. Service Supplies Co.
International Register Co.

Barges, Steel
American Bridge Co.

Batteries, Dry
Nichols-Lintern Co.

Bearings and Bearing Metals
Brill Co., The J. H.
General Electric Co.
Westinghouse Elec. & M. Co.

Bearings, Center and Roller Side
Stucki Co., A.

Bearings, Roller
Timken Roller Bearing Co.

Bells and Buzzers
Consolidated Car Heating Co.

Bells and Gongs
Brill Co., The J. G.
Elec. Service Supplies Co.

Benders, Rail
Railway Track-work Co.

Bodies, Bus
Auto Body Co., The
Cummings Car & Coach Co.

Body Material, Haskelite & Plymetl
Haskelite Mfg. Corp.

Boilers
Babcock & Wilcox Co., The

Boiler Tubes
National Tube Co.

Bond Testers
Amer. Steel & Wire Co.
Elec. Service Supplies Co.

Bonding Apparatus
Amer. Steel & Wire Co.
Elec. Ry. Improvement Co.
Elec. Service Supplies Co.
Ohio Brass Co.
Railway Track-work Co.
Una Welding & Bonding Co.

Bonds, Rail
Amer. Steel & Wire Co.
Elec. Ry. Improvement Co.
Elec. Service Supplies Co.
General Electric Co.
Ohio Brass Co.
Railway Track-work Co.
Una Welding & Bonding Co.
Westinghouse Elec. & M. Co.

Book Publishers
McGraw-Hill Book Co.

Brackets and Cross Arms (See also Poles, Ties, Posts etc.)
American Bridge Co.
Elec. Ry. Equipment Co.
Elec. Service Supplies Co.
Hubbard & Co.
Ohio Brass Co.

Brake Adjusters
Brill Co., The J. G.
Nat'l Ry. Appliance Co.
Westinghouse Tr. Br. Co.

Brake Shoes
Brill Co., The J. G.
Wheel Truing Brake Shoe Co.

Brakes, Brake Systems and Brake Parts
Brill Co., The J. G.
General Electric Co.
National Brake Co.
Westinghouse Tr. Br. Co.

Bridges, Steel
American Bridge Co.

Brushes, Carbon
General Electric Co.
Jeandron, W. J.
Le Carbone Co.
Westinghouse Elec. & M. Co.

Buildings, Steel
American Bridge Co.

Bulkheads
Haskelite Mfg. Corp.

Bunkers, Coal
American Bridge Co.

Buses, Motor
Auto Body Co.
Brill Co., The J. G.
Cummings Car & Coach Co.
International Motor Co.
Mack Trucks
White Co., The

Bus Seats
Hale-Kilburn Co.

Bushings, Case Hardened and Manganese
Brill Co., The J. G.

Cables (See Wires and Cables)

Cambric Tapes, Yellow & Black Varnish
Irvington Varnish & Ins. Co.

Cambric Yellow & Black Varnish
Mica Insulator Co.

Carbon Brushes (See Brushes, Carbon)

Car Lighting Apparatus
Elec. Service Supplies Co.

Car Panel Safety Switches
Consolidated Car Heating Co.
Westinghouse Elec. & M. Co.

Car Wheels, Rolled Steel
Bethlehem Steel Co.

Cars, Dump
Brill Co., The J. G.
Differential Steel Car Co., Inc.

Cars, Gas Rail
Brill Co., The J. G.

Cars, Passenger, Freight Express, etc.
American Car Co.
Brill Co., The J. G.
Cummings Car & Coach Co.
Kuhlman Car Co., G. C.
National Ry. Appliance Co.
Wason Mfg. Co.

Cars, Second Hand
Electric Equipment Co.

Cars, Self-Propelled
Brill Co., The J. G.
General Electric Co.

Castings, Gray Iron and Steel
American Bridge Co.
Amer. Steel Foundries
Standard Steel Works
Wm. Wharton, Jr. & Co.

Catchers and Retrievers, Trolley
Earll, C. I.
Elec. Service Supplies Co.
Ohio Brass Co.
Wood Co., Chas. N.

Catenary Construction
Archbold-Brady Co.

Ceiling Car
Haskelite Mfg. Corp.
Pantasote Co., Inc., The

Ceilings, Plywood Panels
Haskelite Mfg. Corp.

Cement Accellerator
North American Cement Corp.

Change Carriers
Cleveland Fare Box Co.
Electric Service Supplies Co.

Circuit Breakers
General Electric Co.
Westinghouse Elec. & M. Co.

Clamps and Connectors for Wires and Cables
Anderson Mfg. Co., A. M. & J. M.
Elec. Ry. Equipment Co.
Elec. Ry. Improvement Co.
Elec. Service Supplies Co.
General Electric Co.
Hubbard & Co.
Ohio Brass Co.
Westinghouse Elec. & M. Co.

Cleaners and Scrapers, Track (See also Snow-Plows, Sweepers and Brooms)
Brill Co., The J. G.
Ohio Brass Co.
Root Spring Scraper Co.

Clusters and Sockets
General Electric Co.

Coal and Ash Handling (See Conveying and Hoisting Machinery)

Coils, Armature and Field
General Electric Co.
Westinghouse Elec. & M. Co.

Coil Banding and Winding Machines
Electric Service Sup. Co.
Westinghouse Elec. & M. Co.

Coils, Choke and Kicking
Electric Service Supplies Co.
General Electric Co.
Westinghouse Elec. & M. Co.

Coin-Counting Machines
Cleveland Fare Box Co.
International Register Co.

Coin Sorting Machines
Cleveland Fare Box Co.

Coin Wrappers
Cleveland Fare Box Co.

Commutator Slotters
Electric Service Supplies Co.
General Electric Co.
Westinghouse Elec. & M. Co.
Wood Co., Chas. N.

Commutator Truing Devices
General Electric Co.

Commutators or Parts
Cameron Elec'l Mfg. Co.
General Electric Co.
Westinghouse Elec. & M. Co.

Compressors, Air
General Electric Co.
Westinghouse Tr. Br. Co.

Condensers
General Electric Co.
Westinghouse Elec. & M. Co.

Condenser Papers
Irvington Varnish & Ins. Co.

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Std. Underground Cable Co.

Connectors, Solderless
Westinghouse Elec. & M. Co.

Connectors, Trailer Car
Consolidated Car Heating Co.
Elec. Service Supplies Co.
Ohio Brass Co.

Controller Regulators
Electric Service Supplies Co.

Controllers or Parts
General Electric Co.
Westinghouse Elec. & M. Co.

Controlling Systems
General Electric Co.
Westinghouse Elec & M. Co.

Converters, Rotary
General Electric Co.
Westinghouse Elec. & M. Co.

Conveying & Hoisting Machinery
American Bridge Co.

Copper Wire
American Brass Co., The
American Steel & Wire Co.
Anaconda Copper Mining Co.
Rome Wire Co.

Cord, Bell, Trolley, Register, etc.
Brill Co., The J. G.
Electric Service Supplies Co.
International Register Co.
Roebllngs Sons Co., John A.
Samson Cordage Works

Cord Connectors and Couplers
Electric Service Supplies Co.
Samson Cordage Works
Wood Co., Chas. N.

Couplers, Car
American Steel Foundries
Brill Co., The J. G.
Ohio Brass Co.
Westinghouse Tr. Br. Co.

Cranes, Hoists and Lifts
Electric Service Supply Co.

Cross Arms (See Brackets)

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Ramapo Ajax Corp.
Wm. Wharton, Jr. & Co.

Crossing Foundations
International Steel Tie Co.

Crossing Frogs and Switch
Ramapo Ajax Corp.
Wm. Wharton Jr. & Co.

Crossings, Manganese
Bethlehem Steel Co.
Ramapo Ajax Corp.
Wm. Wharton, Jr. & Co.

Crossing Signals. (See Signal Systems, Highway Crossing)

Crossings, Track, (See Track, Special Work)

Crossings, Trolley
Ohio Brass Co.
Westinghouse E. & M. Co.

Curtains and Curtain Fixtures
Brill Co., The J. G.
Morton Mfg. Co.
Pantasote Co., Inc., The

Dealers' Machinery
Electric Equipment Co.
Sachsenmaier Co., Geo.

Derailing Switches
Ramapo Ajax Corp.

Destination Signs
Electric Service Supplies Co.

Detective Service
Wish Service, Edward P.

Door Operating Devices
Brill Co., The J. G.
Consolidated Car Heating Co.
National Pneu. Co., Inc.

Doors and Door Fixtures
Brill Co., The J. G.
General Electric Co.
Hale-Kilburn Co.
Morton Mfg. Co.

Doors, Folding Vestibule
National Pneumatic Co., Inc.

Draft Rigging. (See Couplers)

Drills, Track
American Steel & Wire Co.
Electric Service Supplies Co.
Ohio Brass Co.

Dryers, Sand
Electric Service Supplies Co.
Ohio Brass Co.
Westinghouse Elec. & Mfg. Co.

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Ohio Brass Co.
Westinghouse E. & M. Co.

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Railway Track-work Co.

Electric Transmission Towers
American Bridge Co.

Electrodes, Carbon
Railway Track-work Co.
Una Welding & Bonding Co.

Electrodes, Steel
Railway Track-work Co.
Una Welding & Bonding Co.

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American Steel & Wire Co.
Roebling's Sons Co., J. A.
Rome Wire Co.

Engineer Inspecting & Chemists
Pittsburgh Testing Laboratory

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Beeler, John A.
Buchanan & Layng
Byllesby & Co., H. M.
Day & Zimmerman, Inc.
Drum & Co., A. L.
Ford, Bacon & Davis
Hemphill & Wells
Holst, Engelhardt W.
Jackson, Walter
Kelker & De Lew
McClellan & Junkersfeld
Richey, Albert S.
Sanderson & Porter
Stevens & Wood, Inc.
Stone & Webster
White Eng. Corp., The J. G.

Engines, Gas, Oil and Steam
Westinghouse Elec. & M. Co

Engines, Gasoline
Continental Motors Co.

Exterior Side Panels
Haskelite Mfg. Corp.

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Cleveland Fare Box Co.
Nat'l Ry. Appliance Co.
Ohmer Fare Register Co.
Perey Mfg. Co., Inc.

Fare Registers
Electric Service Supplies Co.
Ohmer Fare Register Co.

Fences and Fence Posts
American Steel & Wire Co

Fences, Woven Wire and Fence Posts
Acme Wire Co., The
Amer. Steel & Wire Co.

Fenders and Wheel Guards
Brill Co., The J. G.
Consolidated Car Fender Co
Root Spring Scraper Co.
Star Brass Works
Wood Co., Chas. N.

Fibre and Fibre Tubing
Westinghouse Elec. & M. Co

Field Coils (See Coils)

Flangeway Guards, Steel
W. S. Godwin Co., Inc.

Flaxlinum Insulation
Nat'l Ry. Appliance Co.

Floodlights
Electric Service Sup. Co.

Floor, Sub
Haskelite Mfg. Corp.

Floors
Haskelite Mfg. Corp.

Forgings
Brill Co., The J. G.
Carnegie Steel Co.
Standard Steel Works

Frogs & Crossings, Tee Rail
Bethlehem Steel Co.
Ramapo Ajax Corp.
Wm. Wharton, Jr. & Co.

Frogs, Track. (See Track Work)

Frogs, Trolley
Electric Service Supplies Co
Ohio Brass Co.
Westinghouse E. & M. Co

Funnell Castings
Wm. Wharton, Jr. & Co

Furnaces, Electric Steel Melting
American Bridge Co.

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Consolidated Car Heating Co.
General Electric Co.
Westinghouse Elec. & M. Co

Fuses, Refillable
General Electric Co.

Gaskets
Westinghouse Tr. Br. Co

Gas-Electric Cars
General Electric Co.
Westinghouse Elec. & Mfg. Co.

Gas Producers
Westinghouse Elec. & M. Co

Gates, Car
Brill Co., The J. G

Gauges, Oil and Water
Ohio Brass Co.

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Brill Co., The J. G.
Carnegie Steel Co
Standard Steel Works

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Nuttall Co., R. D.
Tool Steel Gear & Pinion Co.

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General Electric Co.

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General Electric Co.
Westinghouse Elec. & M Co

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Lorain Steel Co., The

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Greases (See Lubricants)

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Railway Track-work Co.

Grinders, Portable Electric
Railway Track-work Co

Grinding Bricks and Wheels
Railway Track-work Co.

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Wm. Wharton, Jr. & Co.

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Wm. Wharton, Jr. & Co.

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Electric Service Sup. Co
Ohio Brass Co.

Harps, Trolley
Electric Service Sup. Co.
Nuttall Co., R. D.
Star Brass Works

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Electric Service Sup. Co.
General Electric Co.
Ohio Brass Co.

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Pantasote Co., Inc., The

Heaters, Car (Electric)
Consolidated Car Heating Co.
Gold Car Heating & Lighting Co.
Nat'l Ry. Appliance Co.
Smith Heater Co., Peter

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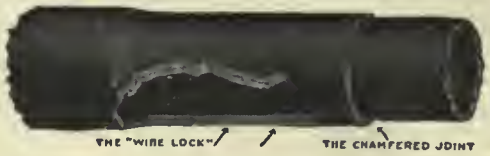
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Mica Insulator Co.
Okonite Co.
Okonite-Callender Cable Co., Inc.
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Electric Service Sup. Co.
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Ohio Brass Co.
Westinghouse Elec. & M. Co.

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Manganese Steel, Special Track Work
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Wm. Wharton, Jr. & Co.

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Ramapo Ajax Corp.
Wm. Wharton, Jr. & Co.

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(See Buses, Motor)

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Ohio Brass Co.

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General Electric Co.
Wood Co., Chas. N.

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Westinghouse Tr. Br. Co.

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National Tube Co.

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Standard Steel Works
Westinghouse Trac. Brake Co.

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Poles, Metal Street
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Naugle Pole & Tie Co.

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Electric Service Supplies Co.
National Tube Co.
Nuttall Co., R. D.

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Electric Service Supplies Co.
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L. B. Foster Co.

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Metal Thermit Corp.

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Consolidated Car Heating Co.

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Westinghouse Elec. & M. Co.

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Roofs, Car and Bus
Haskelite Mfg. Corp.

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Electric Service Sup. Co.
Nichols-Lintern Co.
Ohio Brass Co.
St. Louis Car Co.

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Brill Co., The J. G.

Sash, Metal, Car Window
Hale-Kilburn Co.

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Screw Drivers, Rubber Insulated
Electric Service Sup. Co.

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Haskelite Mfg. Corp.
Pantasote Co., Inc., The

Seats, Bus
Brill Co., The J. G.
Hale-Kilburn Co.

Seats, Car (See also Rattan)
Brill Co., The J. G.
Hale-Kilburn Co.

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Sachsenmaier Co., Geo.

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Brill Co., The J. G.

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Cleveland Pneumatic Tool Co.

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Brill Co., The J. G.
Hubbard & Co.

Shovels, Power
Brill Co., The J. G.

Signals, Car Starting
Consolidated Car Heating Co.
Electric Service Sup. Co.
Nat'l Pneumatic Co., Inc.

Signals Indicating
Nichols-Lintern Co.

Signal Systems, Block
Electric Service Sup. Co.
Nachod Signal Co., Inc.
Union Switch & Signal Co.
Wood Co., Chas. N.

Signal Systems, Highway Crossing
Nachod Signal Co., Inc.

Slack Adjusters (See Brake Adjusters)

Slag
Carnegie Steel Co.

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Electric Ry. Equip. Co.
Electric Ry. Improvement Co.
Electric Service Sup. Co.
Nuttall Co., R. D.

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Nichols-Lintern Co.

Snow-Plows, Sweepers and Brooms
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Consolidated Car Fender Co.
Cummings Car & Coach Co.
Root Spring Scraper Co.

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Irvington Varnish & Ins. Co.

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Lorain Steel Co., The
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Amer. Steel & Wire Co.

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Westinghouse Elec. & M. Co.

Splicing Sleeves (See Clamps and Connectors)

Springs, Car and Truck
American Steel Foundries
American Steel & Wire Co.
Brill Co., The J. G.
Standard Steel Works

Sprinklers, Track and Road
Brill Co., The J. G.
Cummings Car & Coach Co.

Steel and Steel Products
Carnegie Steel Co.
Morton Mfg. Co.

Steel Car Doors
Morton Mfg. Co.

Steel, Flooring
Morton Mfg. Co.

Steps, Car
Brill Co., The J. G.
Morton Mfg. Co.

Stokers, Mechanical
Babcock & Wilcox Co.
Westinghouse Elec. & M. Co.

Stop Signals
Nichols-Lintern Co.

Storage Batteries (See Batteries, Storage)

Strain Insulators
Electric Service Supplies Co.
Ohio Brass Co.
Westinghouse E. & M. Co.

Strand
American Steel & Wire Co.
Roebling's Sons Co., J. A.

Street Cars, Passenger
(See Cars, Passenger, Freight, Express, etc.)

Superheaters
Babcock & Wilcox Co.

Sweepers, Snow (See Snow Plows, Sweepers and Brooms)

Switch Stands and Fixtures
Ramapo Ajax Corp

Switches and Switchboards
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Electric Service Sup. Co.
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Switches, Tee Rail
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Switches, Track (See Track, Special Work)

Tampers, Tie
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Wm. Wharton, Jr. & Co.

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Gold Car Heating & Lighting Co.
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Carnegie Steel Co.
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Railway Trackwork Co.
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(Continued on page 35)

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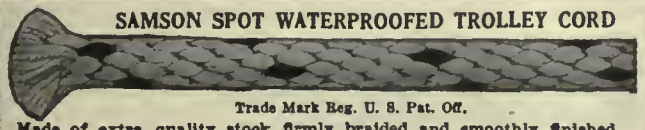
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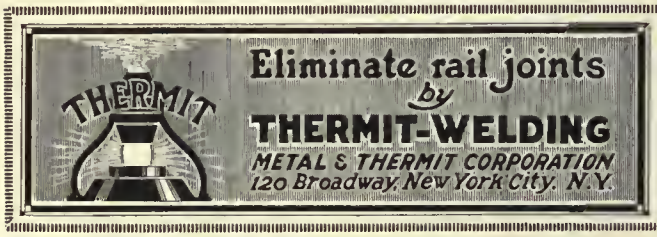
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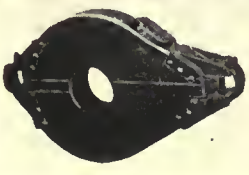
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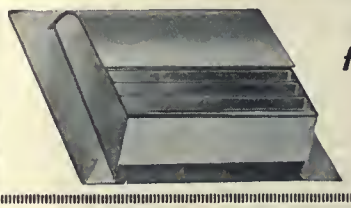
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ALPHABETICAL INDEX TO ADVERTISEMENTS

Page

A

Acme Wire Co., The..... 44
Allison Co., J. E..... 20
American Asphalt Paint Co.... 51
American Brass Co., The..... 53
American Bridge Co..... 48
American Car Co.....32-33-57
American Electrical Works.... 53
American Insulating Machinery Co. 53
American Steel & Wire Co..... 45
American Steel Foundries 15
Anaconda Copper Mining Co.... 53
Anchor Webbing Co..... 53
Archbold-Brady Co..... 21
Association of Mfgs. Chilled Car Wheels 39
Auto Body Co., The..... 27

B

Babcock & Wilcox Co..... 53
Beeler Organization 20
Bell Lumber Co..... 53
Bethlehem Steel Company 48
Brill Co., The J. G.....32-33-57
Buchanan & Layng Corp..... 21
Byllesby Engineering and Management Corp..... 20

C

Cameron Electrical Mfg. Co.... 21
Carnegie Steel Co..... 35
Chillingworth Mfg. Co..... 54
Cleveland Fare Box Co..... 21
Cleveland Pneumatic Tool Co... 26
Collier, Inc., Barron G..... 40
Consolidated Car Fender Co.... 54
Consolidated Car Heating Co... 54
Continental Motors Corp'n..... 56
Cummings Car & Coach Co..... 31

D

Dayton Mechanical Tie Co....36-37
Day & Zimmermann, Inc..... 20
Differential Steel Car Co., The.. 48
Doyle, Kitchen & McCormick, Inc. 23
Drum & Co., A. L..... 20

Page

E

Earll, C. I..... 46
East St. Louis and Sub. Ry. Co. 49
Electric Equipment Co..... 40
Electric Ry. Equipment Co.... 51
Electric Ry. Improvement Co.. 17
Electric Service Supplies Co.... 6
English Electric Co....Insert A & B

F

Ford, Bacon & Davis..... 20
"For Sale" Ads..... 49
Foster & Co., L. B..... 38

G

General Electric Co., 18 & Back Cover
Godwin Co., Inc., W. S..... 21
Gold Car Heating & Ltg. Co.... 54
Goodyear Tire & Rubber Co., Inc. 22

H

Hale-Kilburn Co..... 54
Haskelite Mfg. Co..... 30
"Help Wanted" Ads..... 49
Hemphill & Wells 20
Holst, Englehard W..... 20
Hubbard & Co..... 48

I

International Creosoting & Construction Co..... 14
International Motor Co., Inc..12-13
International Register Co..... 47
International Steel Tie Co., The. 7
Irvington Varnish & Insulator Co. 51

J

Jackson, Walter 20
Jeandron, W. J..... 49
Johnson & Co., Inc., J. R..... 54

Page

K

Kelker, DeLeuw & Co..... 20
Kelly-Springfield Tire Co..... 24
Kuhlman Car Co.....32-33-57

L

Le Carbon Co..... 49
Lorain Steel Co..... 48
Ludlum Steel Co..... 48

M

Mack Trucks, Inc.....12-13
McClellan & Junkersfeld..... 20
McGraw-Hill Book Co., Inc..... 44
McGraw-Hill Pub. Co., Inc...42-43
Metal & Thermit Corp..... 54
Mica Insulator Co..... 46
Morton Mfg. Co..... 53

N

Nachod and United States Signal Co., Inc..... 54
National Brake Co..... 19
National Pneumatic Co., Inc... 11
National Ry. Appliance Co.... 49
National Tube Co..... 16
Naugle Pole & Tie Co..... 53
Nichols-Llotern Co., The..... 54
North American Cement Corp.. 21
Nuttall Co., R. D..... 46

O

Ohio Brass Co..... 5
Ohmer Fare Register Co..... 28
Okonite-Callender Cable Co., Inc., The .....Front Cover
Okonite Co., The.....Front Cover

P

Pantasote Co., Inc..... 47
Perey Mfg. Co., Inc..... 21
Pittsburgh Testing Laboratory.. 51
Positions Wanted and Vacant.. 49

Page

R

Railway Track-work Co..... 4
Railway Utility Co..... 54
Ramapo Ajax Co..... 54
Richey, Albert S..... 20
Roebling's Sons Co., John A... 53
Rome Wire Co..... 10
Rooks Automatic Register Co.. 51
Root Spring Scraper Co..... 54

S

Sachsenmaier Co., Geo..... 49
Samson Cordage Co..... 53
Sanderson & Porter 20
Searchlight Section 49
Smith Heater Co., Peter..... 54
Standard Steel Works Co..... 34
Standard Underground Cable Co. 47
Star Brass Works..... 51
Stevens & Wood, Inc..... 20
Stone & Webster 20
Stueki Co., A..... 54

T

Texas Company 41
Timken Roller Bearing Co..... 29
Tool Steel Gear & Pinion Co... 47

U

Una Welding & Bonding Co.... 21
Union Switch & Signal Co..... 8
Universal Lubricating Co..... 49

W

"Want" Ads 49
Wason Mfg. Co.....32-33-57
Westinghouse Elec. & Mfg. Co.. 2
West'gh'se Traction Brake Co.. 9
Wharton, Jr. & Co., Inc., Wm.. 48
"What and Where to Buy"..50-52
Wheel Truing Brake Shoe Co.. 51
White Eng. Corp., The J. G.... 20
White Co., The..... 25
Wish Service, The P. Edw.... 21
Wood Co., Chas. N..... 54

WHAT AND WHERE TO BUY

(*Continued from page* 52)

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Morton Mfg. Co.

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Electric Ry. Improvement Co.
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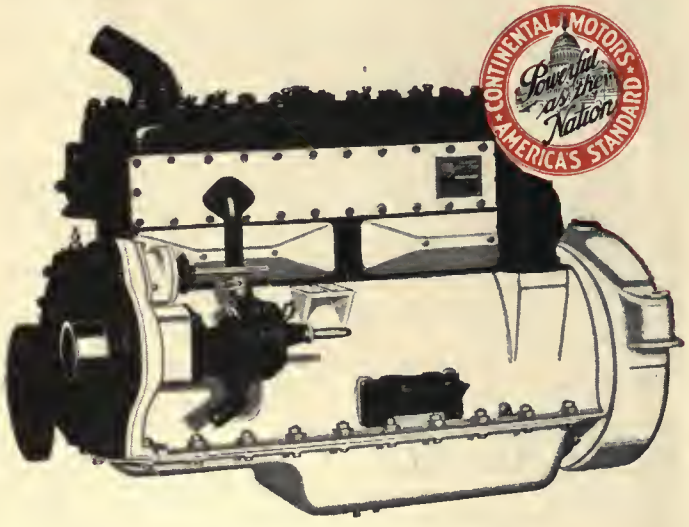
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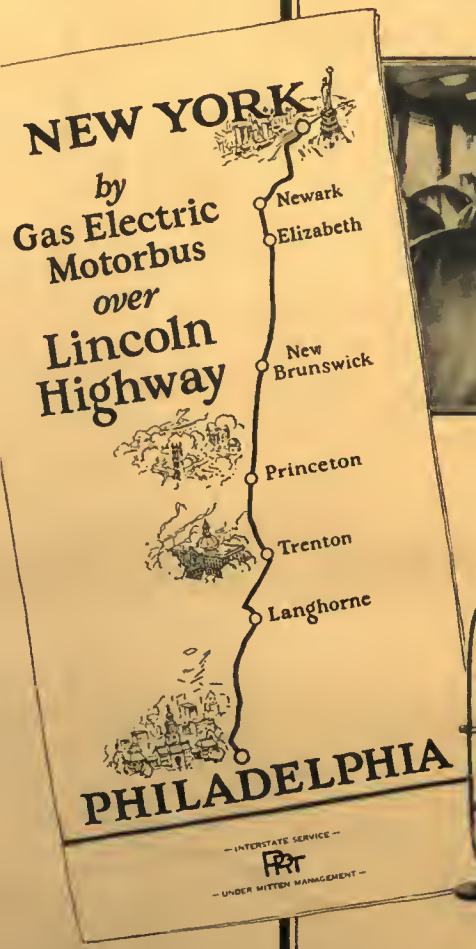
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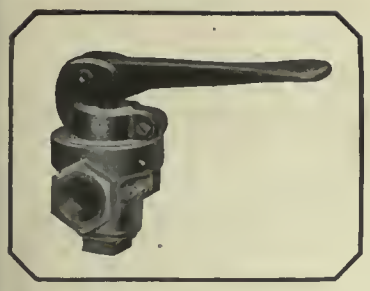
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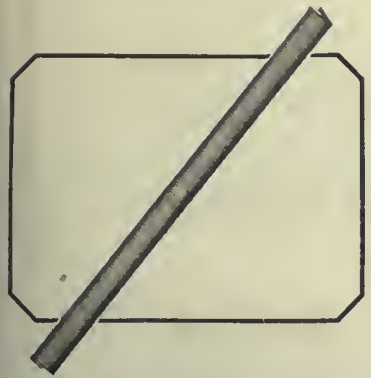
Diaphragm Type of O-B Sander Valve, supported by air pipe line. Also furnished with bracket for fastening to car panel.



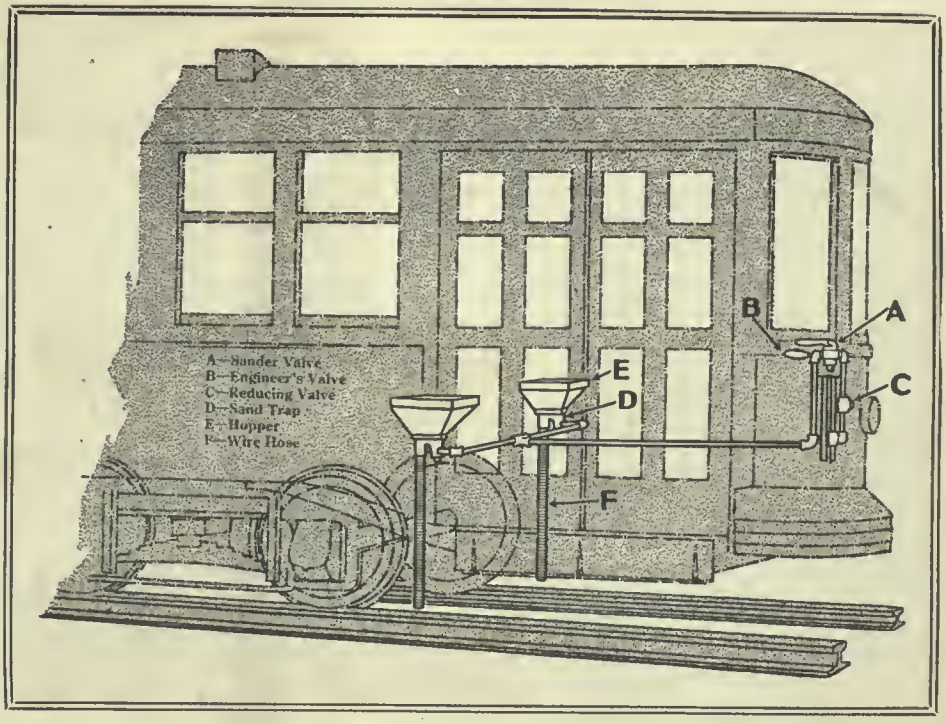
Sand Trap (Form 1) having spout fitted with studs to hold wire sander hose of 2-in outside diameter.



Sand Trap (Form 2) having inside of spout threaded to take 1-in. standard pipe.



Wire Sander Hose for Form 1 Sand Trap. Attaches to outside of the Trap spout.



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By specifying the O-B Air Sander, they meet the five major requirements for this part of the car's equipment:—efficient operation, air conservation, convenience in use, and years of practically attention-free, reliable service. These are assured by O-B care and skill in design and manufacture.

An important feature is the flexible bronze diaphragm between Sander Valve Stem and Plunger. This prevents air leakage around the plunger stem when in use and eliminates the need of packing, making operation easier.

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Niagara Falls, Canada

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The A B C's of Bus Brakes and Braking Systems

How Many Wheels Should Brakes Go On?

Friction (or adhesion) between tires and the road surface is the means through which a vehicle is stopped. A vehicle of given weight travelling at given speed requires a definite force to stop it, whether that force be concentrated on two wheels or divided among them all.

This friction develops heat—heat in the tread when it comes in contact with the road and heat in the drum and liner. Heat, if extreme, causes vulcanization of the tire and consequent short life. Extreme heat also causes drum expansion which may mean serious trouble, and heat does, in time, break down conventional liner materials.

* * * *

The wheels "lock" when the braking force exceeds the friction between tires and road surface. The more the braking effort is concentrated the greater the chances of locking the wheels.

Another point regarding "locked" wheels; they haven't the ADHESION of rolling wheels. The moment wheels commence to slide, effective braking decreases. Sliding wheels are rough on tires, too.

Extreme heating, with its consequent effect upon tires and brakes, is most likely to occur when the braking is concentrated. Skidding with its loss of control, decreased braking effect, and tear on tires is most likely to occur when the braking is concentrated. *THE CONCLUSION IS OBVIOUS.* The more wheels the braking effort is spread over, the less heat per wheel, the less likelihood of locking the wheels, the less danger, the less wear on tires, and the more effective the braking. Brakes should be on ALL wheels—four, six or eight. And now that practical equalization can be obtained there remains NO reason for not having brakes on all wheels, front and rear.

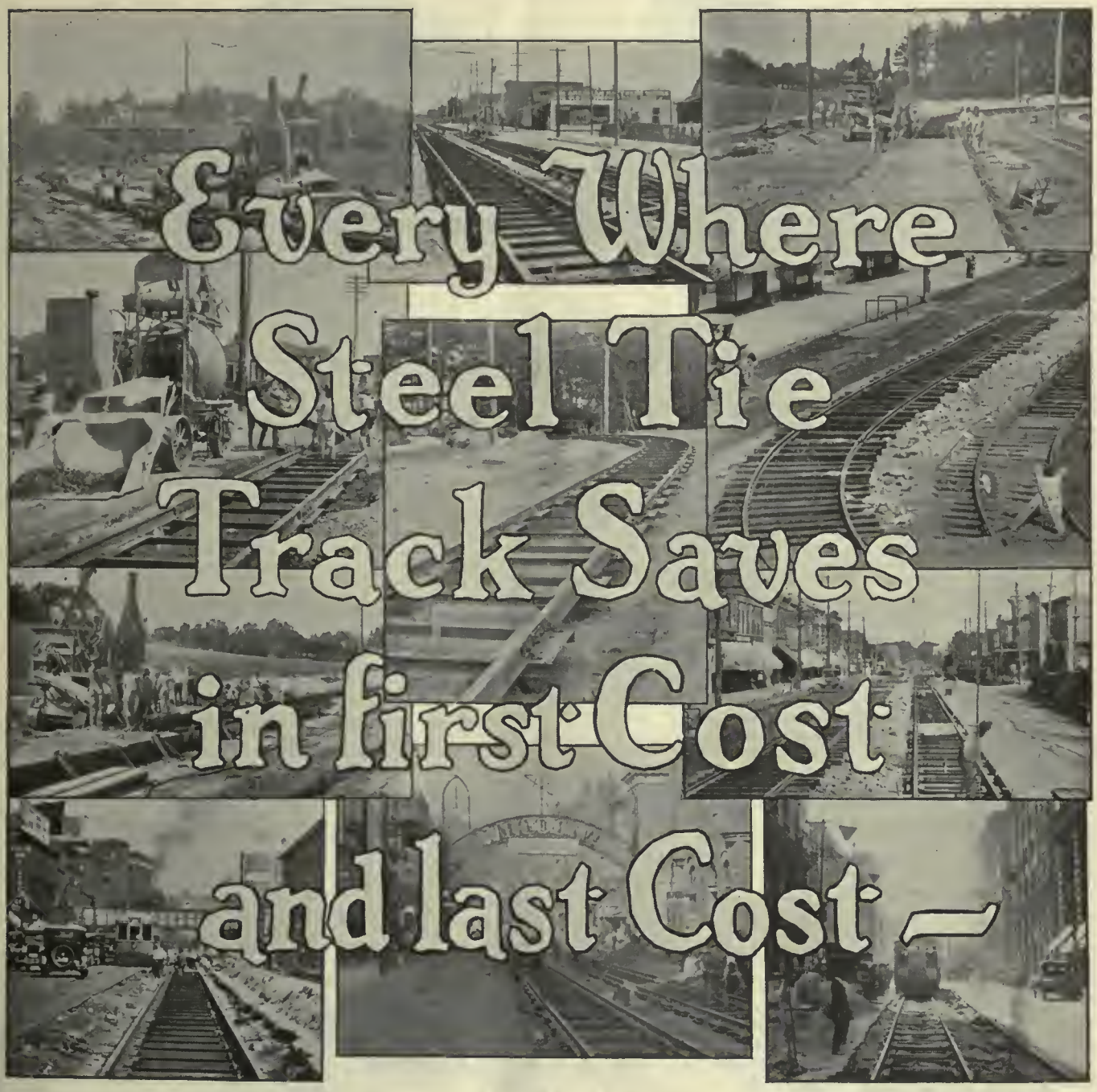
This is the second of an informative series on Bus brakes. The series consists of:—

"A"—What brakes must do.
"B"—How many wheels should brakes go on?
"C"—Self-equalization and brake adjustments.
"D"—Curing the skid.
"E"—Metal to metal or molded linings—which?
"F"—Compressor Mountings and Drives.
"G"—Compressor Cooling.
"H"—The Control Valve.
"I"—Maintenance on Different Types.

The other topics will appear in the above order. Address any comments, suggestions, or requests for advance information to—

The Christensen Air Brake Co.
6513 Cedar Ave., Cleveland, Ohio

Christensen



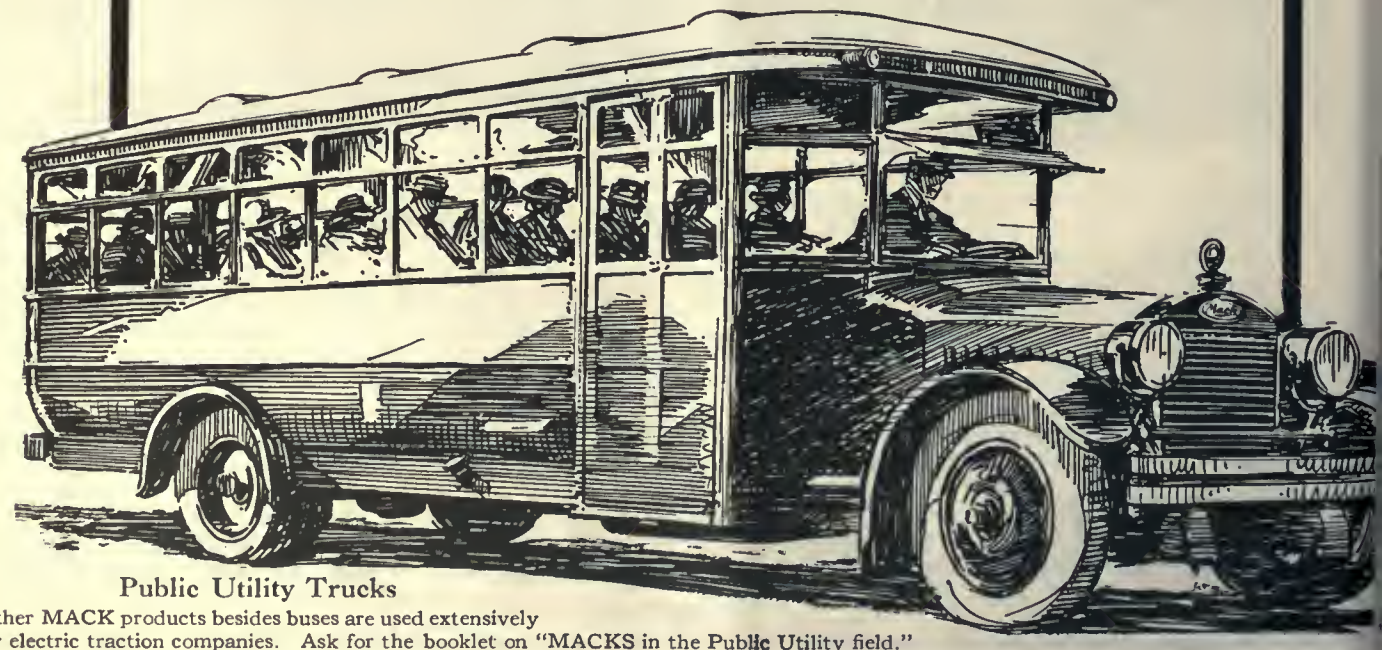
Write today for catalog costs and quotation

THE INTERNATIONAL STEEL TIE CO.
Cleveland, Ohio

Steel Twin Tie Track

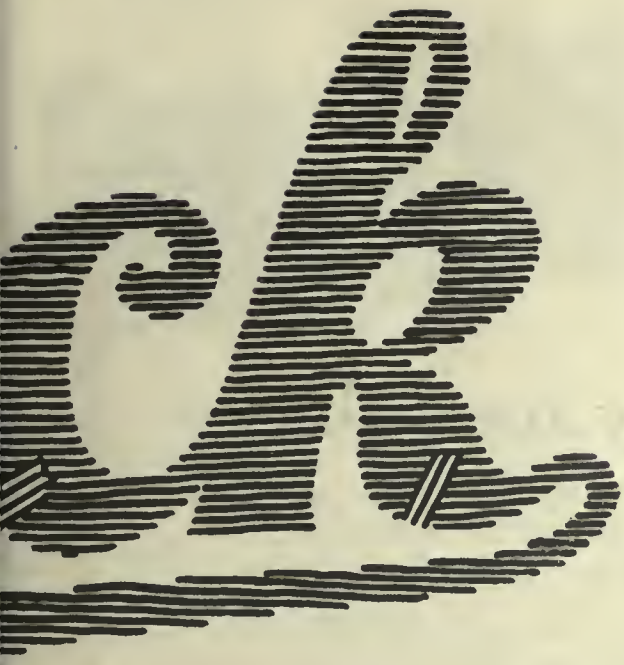
Operator's Check

Illinois Power & Light Corp., Chicago, Ill.
The Connecticut Co., New Haven, Conn.
Chicago, West Towns & Northern R.R., Chicago
Lehigh Traction Co., Hazleton, Pa.
United Electric Railway Co., Providence, R. I.
Columbus Ry., Power & Lt. Co., Columbus, Ga.
Nashua Street Ry. Co., Nashua, N. H.
Boston Elevated Ry., Boston, Mass.
Waterloo, Cedar Falls & North.R.R., Waterloo, Iowa
Illinois Power Co., Springfield, Ill.
Boston & Worcester St. Ry. Co., Framingham, Mass.
Cincinnati St. Ry. Co., Cincinnati, O.
Mississippi Valley Elect. Co., Iowa City, Iowa
New Orleans Public Service Co., New Orleans, La.
Tampa Electric Co., Tampa, Fla.
Chicago, South Bend & Northern Ry., Chicago
Chicago & Joliet Electric Ry. Co., Chicago
Key West Electric Co., Key West, Fla.
Oklahoma Union Ry. Co., Tulsa, Okla.
Municipal Tramways Trust, Adelaide, S. Australia
Iowa Southern Utilities Co., Inc., Des Moines, Iowa
Holyoke Street Ry. Co., Holyoke, Mass.
Durham Public Service Co., Durham, N. C.
Coast Counties Gas & Elect. Co., San Francisco, Cal.
Hartford & Springfield St., Ry. Co., Hartford, Conn.
Worcester Consol. Street Ry., Worcester, Mass.
Binghamton Ry. Co., Binghamton, N. Y.
Wisconsin Power & Light Co., Madison, Wis.
Kansas City Rys., Kansas City, Mo.
Iowa Railway & Light Co., Des Moines, Iowa
Omaha & Lincoln Ry. & Lt. Co., Omaha, Neb.
Arkansas Central Power Co., Little Rock, Ark.
Twin City Rapid Transit Co., St. Paul, Minn.
Wilkes-Barre Ry. Co., Wilkes-Barre, Pa.
Phillipsburg Traction Co., Phillipsburg, N. J.
Wilmington & Philadelphia Traction Co
Union Street Ry. Co., New Bedford, Mass.
Baton Rouge Electric Co., Baton Rouge, La.
Municipal Ry., Eureka, Calif.
Trenton & Mercer County Traction Corp.
Wichita Ry. & Light Corp., Wichita, Kans.
Topeka Railway Co., Topeka, Kans.
Duluth Street Ry. Co., Duluth, Minn.
Mesaba Ry. Co., Virginia, Minn.
Kan. City, Leavenworth & West. Ry., Kan. City, Mo.
Virginia Ry. & Power Co., Norfolk, Va.
New York State Railways
Third Ave. Ry., New York City
Camden & Suburban Ry., Camden, N. J.
Dubuque Electric Co., Dubuque, Ia.
East St. Louis Ry. Co., East St. Louis, Ill.
Los Angeles Ry., Los Angeles, Cal.
Hudson Transit Corp., Newburgh, N. Y.
Newburgh Public Service Corp., Newburgh, N. Y.
Pittsburgh Ry. Co., Pittsburgh, Pa.
Savannah Electric & Power Co., Savannah, Ga.
Tacoma Ry. & Power Co., Tacoma, Wash.
Westside Electric St. Ry. Co., Charleroi, Pa.
Lehigh Valley Transit Co., Allentown, Pa.
Wellington City Council, Wellington, N. Z.
Florida Motor Lines, Inc., Tampa.
Mississippi Power & Lt. Co., Jackson, Miss.
Detroit United Ry., Detroit, Mich.



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Other MACK products besides buses are used extensively by electric traction companies. Ask for the booklet on "MACKS in the Public Utility field."



Mack-Made Buses

25-Passenger City Type
29-Passenger City Type
25-Passenger Parlor Car
25-Passenger Suburban Type
29-Passenger Suburban Type
25-Passenger Gas-Electric
29-Passenger Gas-Electric

Editor's Mail Bag

To the Editor of the Telegraph:

I wish to express at this time, to the Nashua Street Railway Co., and its employes, my heartiest appreciation and thanks for the splendid service they have given us this winter through their city bus lines. We who live off from the car lines certainly appreciate this service, and the kind and courteous treatment we receive from the conductors of the bus at all times makes it a pleasure for us to ride with them.

Considering the exceptionally bad traveling of the last month or two the bus drivers have done wonderful work in keeping so nearly to schedule time and route, and I feel that a word of thanks and appreciation is due them for the splendid service they have rendered to us.

A Satisfied Patron of the North Circuit Bus Line.

Mack builds good will for the Nashua Street Railway Company—

Letters to newspaper editors are not always kicks, as the above clipping proves. Courteous treatment and intelligent operation of buses breed good-will and profits for the street railway companies that depend on Mack buses to augment their service.

In order to be profitable and build good will, bus performance in all kinds of weather and on all kinds of roads must be dependable, whether it is on feeder routes, serving outlying communities, or city service in place of trolley cars.

The author of the letter to the editor of the Nashua Telegraph appreciates the courteous and dependable service of the Nashua Street Railway. Mack did not make the driver but it *did* produce a bus which maintained schedules and routes under adverse conditions. Pleasant personality and courteous treatment from drivers are not in the picture when a bus is falling down on the job.

Macks stay on the job from one end of the year to the other—and they certainly do have regular, old-fashioned winters in Nashua.

MACK TRUCKS, INC.
INTERNATIONAL MOTOR COMPANY
25 Broadway, New York City

Over one hundred direct MACK factory branches operate under the titles of: "MACK MOTOR TRUCK COMPANY," "MACK-INTERNATIONAL MOTOR TRUCK CORPORATION," and "MACK TRUCKS OF CANADA, LTD."



The Mack Bus



Seats that satisfy the public—

To satisfy the public is to sell more rides on both car and bus. For you get not only those who have to ride but also those who might not otherwise ride.

Backed by half a century's seat-making experience, Hale-Kilburn Seats satisfy both rider and operator. Correct design assures comfort on the longest trip. Sound construction guarantees simplicity, minimum weight, and long, hard wear.

Our catalog describes and illustrates the various types for car and bus. *Write for a copy.*



Typical bus seat

No. 901 Double Chair—a graceful, comfortable double chair with divided back and spring cushion pads.



Typical car seat

No. 392-EE—the finest type of interurban car seat with extra high three-part head-roll and mahogany capped armrest.

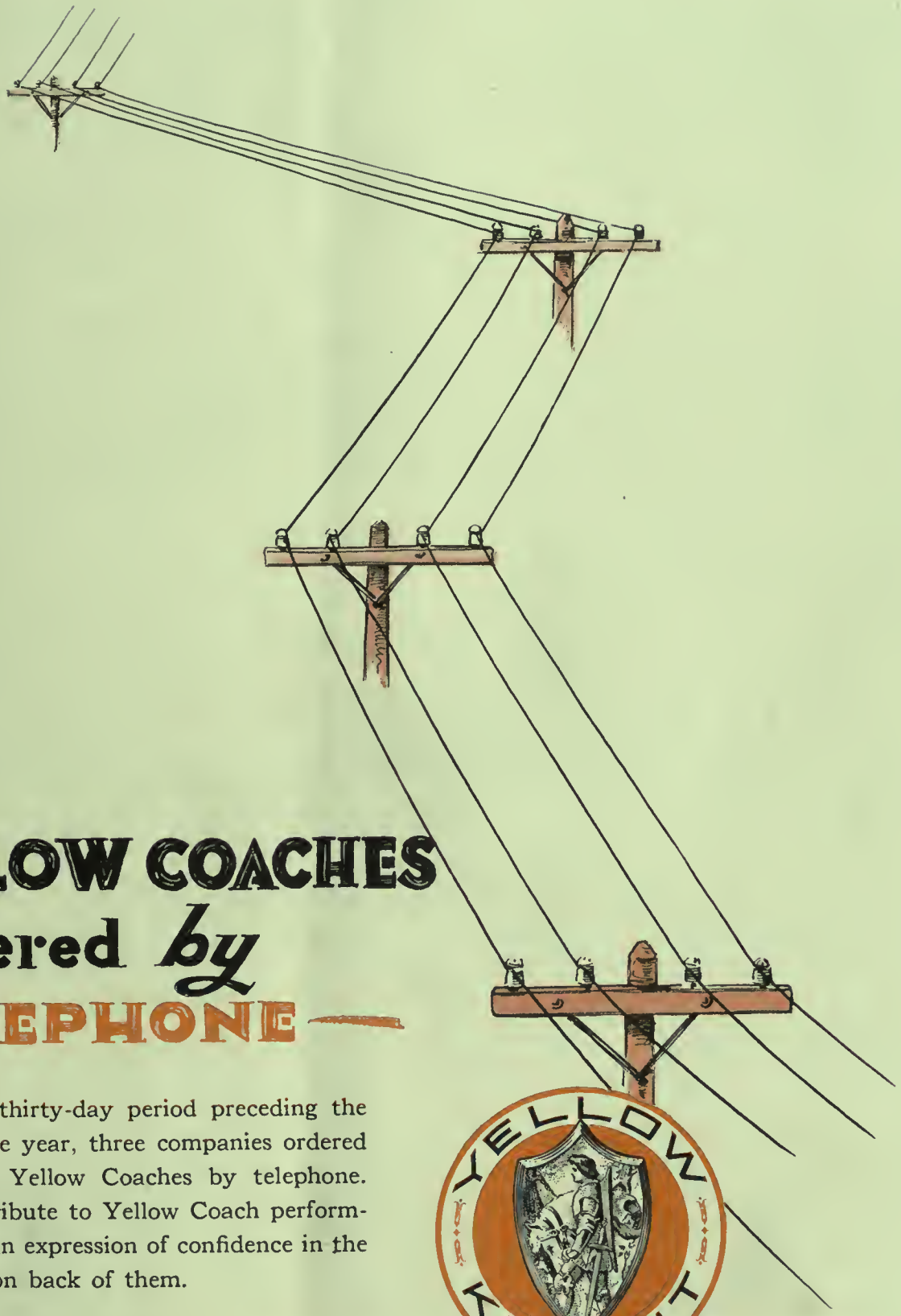
HALE-KILBURN COMPANY

***General Offices and Works:* 1800 Lehigh Avenue, Philadelphia**

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Hale and Kilburn SEATS



YELLOW COACHES ordered *by* TELEPHONE

During a thirty-day period preceding the close of the year, three companies ordered thirty-five Yellow Coaches by telephone. Another tribute to Yellow Coach performance and an expression of confidence in the organization back of them.

YELLOW KNIGHT

Confi



Philadelphia
Rural Transit
Company

dence



first—Belief in Yellow Coaches hen—Knowledge that they are *Right*

IT means something when the Philadelphia Rural Transit Company *telephones* an order for twenty-five Yellow Gas Electric Parlor Coaches. This company operates Yellow Coaches exclusively. Their experience with their large fleet of Yellow Coaches gave them confidence to order more—*by telephone.*

Likewise, the Charleston Interurban R.R. Company, of West Virginia, *used the phone* as the quickest means to order six.

And from Canada, the Montreal Tramways Company expressed their confidence over the telephone by an order for four.

Only the strongest faith in Yellow Coach performance, expressed in low-cost, profitable miles, could thus cause these three companies to initiate their orders over the wire. The only salesmen involved in these transactions were Yellow Coaches themselves.

If you are interested in *low-cost, profitable miles*, our organization stands ready to point the way. Surveys are based on revenue-earning experience and guided by a scientific analysis of transportation conditions. Operating experience governs factory production. It influences the design of every part. It dictates the selection of material. It prepares Yellow Coaches to perform their part in the bigger thing which we have to sell—

—a complete transportation system for a business.

Building Yellow Coaches from this viewpoint builds that confidence that shows so clearly when orders are given over the telephone.

YELLOW COACH plus GENERAL MOTORS

What this alliance means to you

FIRST, Financial stability of organization back of the product—a guarantee over the years against losses arising from "orphan equipment."

SECOND, Substantial economies in engineering, manufacturing and merchandising operations, in which you share.

GENERAL MOTORS represents the greatest manufacturing organization in the world; an organization backed by unlimited technical resources.

Coupled with our own vast operating experience and the famous Yellow Knight Sleeve Valve Engine, the combination which welds together unlimited knowledge of motor vehicle transportation and manufacture offers you a security which guarantees profitable returns on your investment.

YELLOW TRUCK & COACH MANUFACTURING CO.
SUBSIDIARY GENERAL MOTORS CORPORATION
5801 WEST DICKENS AVENUE, CHICAGO, ILL.



CARS OF THE NEW ORLEANS PUBLIC SERVICE, INC.
OPERATING ON CANAL STREET

NP

MAINTAINING HEADWAYS

With operation on close headways, a loss of seconds at each stop may cause a piling up of cars and loss of headway spacing. With National Pneumatic Door Operating Equipment, however, seconds can be *saved* at every stop, not only helping to maintain the headway but speeding up the operating schedule and increasing car revenue.

NATIONAL PNEUMATIC COMPANY

***Executive Office,* 50 Church Street, New York**

***General Works,* Rahway, New Jersey**

CHICAGO
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MANUFACTURED IN
TORONTO, CANADA, BY
Railway & Power Engineering Corp., Ltd.

PHILADELPHIA
1010 Colonial Trust Building



Safety Cars for Atlanta



Georgia Railway and Power Company has made Atlanta a member of "the 400" by providing a superior class of transportation service. This city, together with 400 others, will now enjoy the distinct advantages afforded by the Safety Car.

Forty Safety Cars are now serving Atlanta, and to enhance further an already efficient transportation service, sixty additional Safety Cars are now in the process of construction for early September delivery.

Atlanta is one of the most recent cities that have found, in the wake of Safety Car adoption, a steady stream of increased public satisfaction, stimulated by a safe, constant, adequate, transportation service, unprecedented economically.



SAFETY CAR DEVICES CO.
OF ST. LOUIS, MO.

Postal and Telegraphic Address:
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CHICAGO SAN FRANCISCO NEW YORK WASHINGTON PITTSBURGH

It is a safety car if equipped with our standard Safety Car Control Devices



Equipped with
WESTINGHOUSE AIR BRAKES

Safeguarding the men of tomorrow

Westinghouse Automotive Air Brakes:

—provide ample retarding force for safe control.

—operate by mere touch of hand or foot and relieve driver fatigue.

—are ideal for application to all wheels.

—insure equalized braking forces, which eliminate skidding dangers.

—make possible shorter stops and maintenance of faster schedules.

—reduce brake maintenance costs.

Where the lives of children are concerned, the element of safety, always an essential factor in successful highway transportation, is of prime importance.

In providing a vehicle for this service which will take the boys and girls to school and back again quickly, cozily and comfortably, do not overlook the matter of adequate brake control.

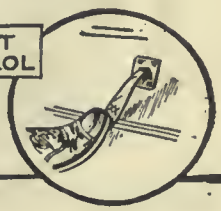
Westinghouse Air Brakes insure safe operation of buses while they thread their way through city traffic, speed along the boulevard, swing around dangerous curves, or coast down long steep hills.

If *you* operate buses that carry school children, have them so equipped that you will enjoy the satisfaction of having provided the proper safeguard for young America.

WESTINGHOUSE TRACTION BRAKE CO.
Automotive Division, Wilmerding, Pa.

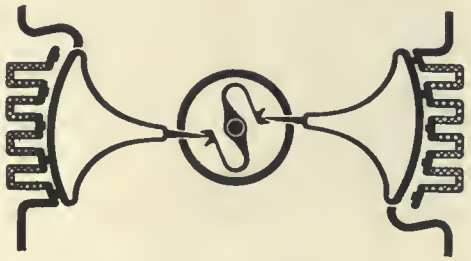


WESTINGHOUSE
***Automotive* AIR BRAKES**



IN THE POWER STATION

*answer:—



FULL automatic regulation as secured by Brown Boveri regulators means complete proportioned equalization of currents in all machines in parallel without any attention on the part of the operator. It means the machine is started, synchronized, and fully loaded on regulation. It means the quiet and stable regulation of machines having entirely different characteristics giving each one its most economic point of saturation. It means cross currents kept to a minimum.

A total of 20,000 machines are now operating under these advantages. These devices will provide for the maintenance of constant voltage current, speed, power or power-factor.

The outline diagram at the top of this page is the symbol of Brown Boveri regulation and includes these three closely related instruments:

Automatic Quick-acting Voltage Regulator.
Automatic Current-limiting Regulator.
Automatic Synchronizer.

ABB

**What is meant by "FULL" as used in the term Full Automatic Regulation*

PRINCIPAL PRODUCTS OF AMERICAN BROWN BOVERI ELECTRIC CORPORATION

Electric Locomotives
for any system of current, high or low, tensions
Complete Equipment
for railway electrification
Mercury-Arc Power Rectifiers
(steel enclosed)
Diesel-Electric Locomotives
Mining Locomotives
Motors (all sizes and types)
Rotary Converters
Motor Generators
Transformers (power or current)
Switches, Controllers
and all Auxiliary Equipment
Oil Switches
Condensers and Auxiliaries
Steam Turbo Generators
for normal or high pressures and superheats
Automatic Regulators
Relays
Turbo Compressors and Blowers
Electric Furnaces
Induction Regulators
Ships
Diesel Driven
Turbine Driven
Electrically Driven
Structural Steel Fabrication

IN THE SUB STATION

*answer:—



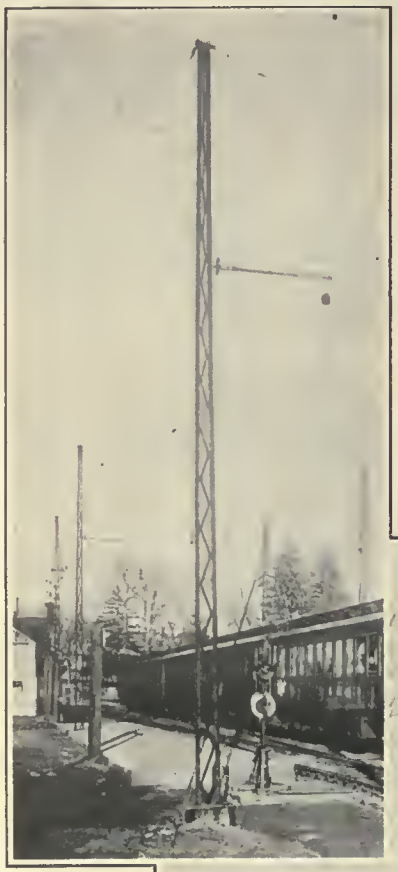
THE meaning of the word "Power" in the term—Mercury-Arc Power Rectifier refers to large steel enclosed units that perform the same service as rotary converters or motor-generators not only more efficiently but with several other advantages. While the basic principle is identical with the familiar mercury-arc glass enclosed rectifier for house lighting voltages, the high duty (reaching 3000 KW) which it performs requires entirely different construction and operating details. Advantages include high efficiency over wide load-variation, absence of the inherent drawbacks of heavy rotating parts, absence of need for synchronizing, very little attendance, absence of hum and vibration and adaptability to automatic control.

**What is the significance of the word "Power" as used in the term Mercury-Arc Power Rectifier?*

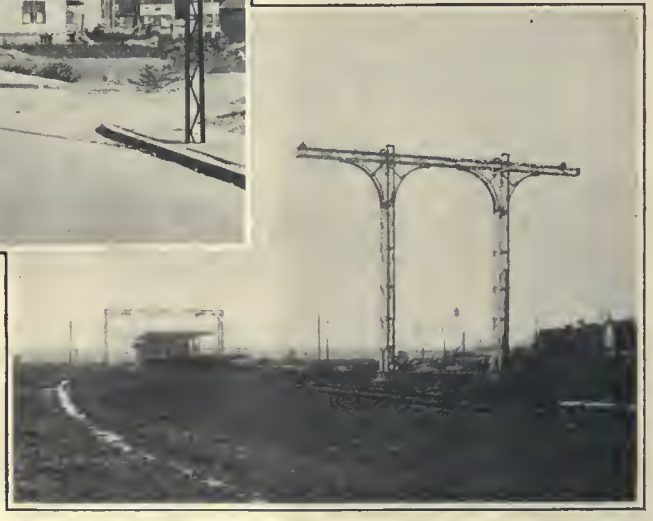
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AMERICAN
BROWN BOVERI
Electric Corporation

Plants: Camden, N. J. Main Office: 165 Broadway, New York







Every Form of Supporting Structure from one source—*BATES*

KEEPING step with the developments of the electric railway industry, and its need for a wide variety of supporting structures, Bates Products have developed from the original Bates Pole to meet every need. In our own plants, we are manufacturing Bates one-piece expanded steel poles, fabricating towers and other more elaborate structures, and when required, galvanizing these products. Bates Fabricated Structures often combine Bates Expanded Steel sections, thus reducing the number of riveted joints and making for greater lightness and strength.

Whatever your requirements, you will find it advantageous to secure an estimate from Bates.

AN ORGANIZATION *specializing on the supporting structure requirements of the electrical industries, having complete facilities for designing, detailing, fabricating and painting or galvanizing its products, all within one company.*

Specify Bates
POLES
TOWERS
SUBSTATIONS
3

Bates Expanded Steel Truss Co.

General Offices and Plants
EAST CHICAGO, INDIANA, U. S. A.



Promote those new cars!

When the industry's twenty-eight thousand new cars are put in operation, passengers will expect every convenience.

Promote good will among the riding public by using the ever reliable Faraday Passenger Signal Systems.

Write for complete information

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PHILADELPHIA 17th and Cambria Sts. — NEW YORK 50 Church St. — CHICAGO Illinois Merchants' Bank Bldg.
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FARADAY CAR SIGNALS



No. 19587
Vibrating Bell



No. 19403
Buzzer



Type A
Push Button

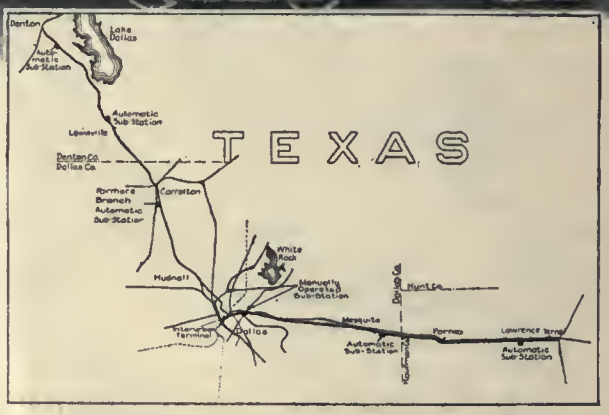


Type B
Push Button

Faraday Car Signal Systems are made for every requirement—high or low voltage systems, buzzers, vibrating bells or single stroke bells, resistance panels, flush or surface type push buttons.



Greater attractiveness and better performance are essential to increased revenue and reduced expense. Both are being achieved by those progressive companies which are operating modern cars.



Three years' operation proved the value of one-man light-weight cars on the Texas Interurban Railway

Operating costs per car-mile, 1925

Maintenance of way and structure	2.9 cts.
Maintenance of equipment	1.0 cts.
Power	6.2 cts.
Conducting transportation	5.8 cts.
General and miscellaneous	11.6 cts.
Total	27.5 cts.

Modern equipment used

Weight of cars complete	31,530 lb.
Motors (4-35 h.p.)	GE-265
Control (single-end)	G-E type K-35
Air Brakes—G-E straight air with emergency feature	
Compressors	G-E type CP-27B

To meet the requirements of modern rolling stock as exemplified by light-weight, high-acceleration cars, the General Electric Company manufactures motors, control, air brake apparatus, and many smaller items of car equipment. The notable achievements of modern cars thus equipped are written in scores of lowered-maintenance records, and attested by many repeat orders.

11-72

GENERAL ELECTRIC

Electric Railway Journal

Consolidation of Street Railway Journal and Electric Railway Review

Published by McGraw-Hill Publishing Company, Inc.

CHARLES GORDON, *Editor*

Volume 67 New York, Saturday, May 8, 1926 *Number* 19

Traffic Police Officers Discuss Street Congestion

ONE whole session of the railway sectional meeting of the Southwestern Public Service Association at Galveston was devoted to traffic problems—not by operators, but by policemen. Lieutenants and captains of traffic squads from a half dozen cities of the Southwest told of traffic problems in their own localities. The railway executives listened.

This is the first time that such a representative group of traffic officers has been gathered together at a railway convention. The results were interesting in that the unanimous opinion of these speakers was that the parked automobile constitutes the greatest nuisance.

It was the unanimous consensus of opinion that officers of the traffic police be invited and welcomed into all meetings of this kind. W. W. Holden, chairman of the railway section, is to be congratulated in getting together such a group. Now if the industry can get together a representative group of merchants and show them the facts—how the arteries leading to their places of business are being clogged—perhaps some drastic action will be possible.

Terms of Cleveland Franchise Made More Liberal

CLEVELAND has modified its Tayler service-at-cost grant. These modifications are very important. They cover practically all the suggestions contained in the report of the Greater Cleveland transportation committee, but they do not include the suggestion of President Stanley of the Cleveland Railway for an increase in the dividend rate from 6 per cent to 7 per cent. That, however, is not regarded as an insuperable barrier considering the other changes that have been made. Maximum fares are made 10 cents instead of 6 cents, and the fare barometer is made $500,000 as a minimum and $1,000,000 as a maximum. The new fare base is particularly significant in that Cleveland started with a 3-cent rate. The removal of the barrier imposed by the former 6-cent maximum fare indicates the growing appreciation of the need for street railway rates that will permit improvement and extension of service. Thus the working out of the original service-at-cost plan in Cleveland is beginning to establish the proper cost of local transportation.

These and other phases of the matter, notably the occasion for the modification of the plan, were the subject of articles in the JOURNAL for April 3 and May 1. Present interest, however, is more in the probable effect of the changes than in a detailed consideration of them. Briefly, it is expected that the changes will permit the company to push car lines and bus feeders into new, developing territories and enable it to better the service on existing lines. To carry out these plans it is estimated that between $3,000,000 and $5,000,000 will be needed. That is very significant.

Basically the ideas behind the Cleveland grant are sound. That fact led more than a dozen other cities to adopt similar grants, but only in a few cases have these grants stood the test of time, and in at least one of them the case has been hopelessly muddled, principally because of the stupidity of the local governing body. Reference is made to the failure of some of these modified grants to work successfully only to emphasize how difficult is the general adoption of any such plan. That, however, is a subject in itself. Perhaps the most persistent criticism of grants of this kind was the so-called "lack of incentive to economical operation" based on the idea that all economies work to the benefit of the car riders rather than the stockholders. The committee made a special effort to develop information that would prove or disprove this criticism. Evidence was lacking to justify the contention. As the Greater Cleveland Transportation Committee and as economists see it the Tayler grant probably represents the most important step that has ever been taken toward reconciling the demands for adequate transportation service with a natural desire for profits for those who undertake to furnish such service. The two things are difficult to reconcile, but they are not necessarily incompatible.

Appreciation of the Annual Report as Public Relations Material

REPORTS of financial operation for the year 1925 now being received indicate the growth in appreciation of the value of the annual statement as a means toward bettering public relations. Accountants and others might be inclined to say that many of these statements are not all that they purport to be. Certainly some of them leave much to be desired, particularly those of the holding companies in which statements are grouped. But much of the mystery about the items that go to make up these statements is being removed by the tone which such reports as those of the Chicago Rapid Transit Company, the Illinois Power & Light Corporation and the Virginia Electric & Power Company, to mention just a few, have assumed.

Particularly noticeable is the change in form and contents of the Virginia statement. This year's report is not only different in size from the ones rendered in recent years but the method of treatment has been altered radically. True, some of the tables of operating statistics available in previous years are missing, but each of the items in the statement of earnings, the balance sheet and the recapitulation of funded debt is made readily understandable. This does not detract from the value of the report to the man accustomed to reading these documents, but the man in the street no longer has to resort to legerdemain to find out what the figures are all about.

Wider distribution of securities among the public is undoubtedly accountable for this decided change in the aspect of many of these formerly formidable documents,

but whatever the reason, the change is certainly a good one from the standpoint of better public relations. Both the Chicago report and the Illinois report are elegantly illustrated as well as clear and informative. Elegance is a matter of taste. There are certain things, however, which the accountant or the engineer expects to find in every report. He is entitled to be informed within reason. This does not mean that any of the things highly desirable to be there have been omitted from any of the reports which have been mentioned. It merely means that after all an annual report, just like a person, should not become ornate at the possible sacrifice of substance.

Public Utilities Better Understood in Dallas

IT IS with a sense of gratification that the industry reads of the solution of the Dallas franchise situation. The Dallas Railway is allowed to charge a 7-cent fare with a 6-cent token rate. There are two important features involved. The increased fare will of course allow a much-needed increase in revenue, but of greater importance is the fact that the company has been successful in inducing the public of that city to appreciate the value of its local transportation system.

This has not been clear sailing, but is a result of continued effort on the part of the management extending over several years in the rendering of a high-grade service. Since Dallas has continued to grow rapidly for several years, this has not been an easy accomplishment. City growth means new investment for new cars and line extensions, and new money does not flow in channels blocked by strangling limitations of earning capacity.

Texas does not have state public utility regulation, hence the burden falls on the local communities to regulate their own utilities. Often misunderstanding and injustice arise from such conditions because of the relatively less experience of local bodies in handling such matters. The advantages accruing from this decision will be mutual. The city will receive the needed extensions and the company will be in position to finance the necessary funds in a satisfactory manner.

So there is reason for congratulation when a company can successfully come to so satisfactory an agreement as that just reached in Dallas.

Transportation Men Can Help in Solving Street Traffic Problem

COMING into a city of medium size some time ago, one of the passengers on an interurban car had occasion to catch a railroad train with but a limited time to spare. Naturally he asked the interurban conductor if he would be able to make the connection. Imagine his surprise when the conductor advised confidentially that if he wanted to be sure of getting to the station in time to catch his train, he should get off and walk, as that was much the quicker. The conductor's answer seemed all the more surprising because there was no unusual traffic block, but only the normal slow movement on the city thoroughfare.

Sadly enough, the condition illustrated by this experience is not unique. To a great extent it may be duplicated in nearly any large city. It is not confined to the street cars nor to street-car streets. Frequently the best conditions for vehicle operation will be found on streets where car lines operate. In New York, for example, it is well known by experienced vehicle drivers that the best running time, whether in buses or automobiles, may be made on those streets with car lines. Of course, the running time even on those streets is still much slower than is desirable if the traffic of the city is not to be choked.

Herein lies one of the greatest problems confronting the transportation man. The automobile and the truck are here to stay. Let there be no doubt about that. The best thing, then, is to regulate their movements—and even more important, the conditions under which they stand still—so that they will not interfere with common-carrier vehicles. The time is rapidly approaching when parking must be restricted sharply, if not eliminated entirely. Loading of trucks in such manner as to block the thoroughfares must also be prohibited.

In all of this development the transportation operator can play a leading part. He can show the public the need for proper traffic regulation. He can demonstrate that the loss to the community is due to catering to the few who cause the most of the trouble. He can do a large share in molding public opinion so that it will be seen that regulation will help the community more than it helps the transportation company, and that in the end it will mean lower fares and better service if it is made possible to move traffic with dispatch.

Success of Bus and Car Depends on Fitting Them Together

IT IS becoming more evident daily that responsible bus manufacturers who have studied the situation carefully do not advocate the wholesale replacement of electric railway lines with buses. Setting aside all considerations of carrying capacity or street congestion, students of the subject are agreed that such replacement would be a bad thing for the development of the bus itself. Should the new vehicle become burdened with the responsibility of rendering mass transportation service at minimum rates, the possibilities for applying it in the various forms of preferential service for which it is inherently so well adapted would be seriously limited.

But upon railway men lies the responsibility for finding the place of the bus and developing such service in proper relation to rail lines. An important step in this procedure involves developing the railway itself to a modern standard of performance and service. Once the street car is brought up to a state of development that exhausts its possibilities, then the place of the bus will become increasingly clear. Until that is done, there is danger of putting the bus into service for which the car is better adapted, while at the same time possibilities for the bus that offer opportunities for profitable operation will be overlooked.

Replacement of obsolete car equipment with rolling stock that fits modern public demand is an important step in giving the railway a new standing before the public. Notable progress is being made in several instances, but there is room for much more. Results accomplished by many properties that have replaced obsolete cars with modern equipment show that such action is not only desirable but profitable. New cars literally pay for themselves in reduced operating cost and increased riding. The public judges the entire standing of the railway by the appearance of its cars.

When old, dilapidated and awkward-looking equipment is continued in service, the public welcomes the advent of new, shiny-looking buses, even when such service is not justified by the needs of the community. When a railway is stampeded into hasty substitution of buses for cars, the bus as well as the railway suffers in the long run.

There is no stronger argument for relief from franchise burdens and paving costs than a group of spick-and-span new cars. Even a few sample cars to show the public what may be expected under improved conditions has in several notable instances brought enthusiastic co-operation from the public. Relief from paving charges would go a long way toward paying the cost of new cars on many properties.

The future of the local transportation industry depends on fitting the two vehicles together in such a way as to get the best results from each. To enter bus operation in a half-hearted manner under the pressure of public demand is fatal to success. To substitute the bus for a run-down railway property in the hope only of making a losing proposition less costly, is after all only a temporary expedient. The ultimate success of the industry depends on using both vehicles under conditions that will permit each to stand on its own feet financially.

When Club and Courtesy Coalesce

"CLUBBING WITH COURTESY," a philosophy advocated recently by a police chief before a somewhat startled audience, is not a contradiction in terms. Railway men certainly would not have been astounded by it. To them this qualification of courtesy is as essential as cleanliness and efficiency, and very often eclipses the other two in importance. From the time the apprentice becomes part of a railway personnel, up through the various stages of his career, he has heard the doctrine of civility preached persistently and consistently to every man in the organization; he has often been an eyewitness to the good results of a "soft answer turneth away wrath" and occasionally a beneficiary in dollars and cents of his own acceptance of this cabala. To club with courtesy is somewhat difficult, but not so difficult as courteously and almost simultaneously to collect fares, issue transfers, answer foolish questions, aid an elderly lady off the car and a crippled customer on, announce the stops, ask the seemingly stubborn crowd to "move up, please," pacify the irascible and smile all the time. It would appear that the conductor returns clubbing with courtesy.

One wonders if he doesn't now and then give vent to his discouragement when he sees that the desire to please isn't so contagious as the good book would have him believe. However, for the many times he thinks his courteous consideration has passed unnoticed there is always the one outstanding incident when he sees in the agitated passenger an excess of sanity over shrewishness, and it is to such an employee's credit that the beginning of a new friendship is directly ascribable.

No railway property is operating today without its ideals of civility as well as those of service and safety, and no new year is greeted by a utility management without the hope that "it can be made a banner one for civility." With this purpose in view it broadcasts courtesy from its house organs and its cars, encourages essays on "the most courteous act," and offers extra rewards for the 100-per-center in politeness.

Beneath the surface of this commander's "clubbing with courtesy" idea lies a thought of more intrinsic value than subsequent humorous comments would lead us to believe. "Club" and "courtesy" are not diametrically opposed. Clubbing is merely an extreme case of chastement or coercion, which has always synchronized with courtesy when deft handling was coupled with a worthy intention. "Clubbing with courtesy" is not incongruous. It only seems so. Somehow, this politeness paradox must be recognized.

No Parking in This Block

"MAIN STREET" of the average so-called single-industry town forms a "bottleneck" which can boast of rush-hour traffic congestion approaching metropolitan city conditions. Tourist travel helps to aggravate the difficulty. This precious stretch of highway was due for a repaving in a certain city, and the people painfully looked forward to "when Main Street gets torn up." But their troubles never happened. When the railway began its work it relaid both tracks and paved its part of the street without hindering its service. But that wasn't all. A sign was placed at each end of the block bidding automobiles not to park. Then a surprising thing was discovered. The railway tracks were necessarily exclusively available to the street cars, and the rest of the street was kept open for the traffic that wanted to move. Night-time conditions lasted all day long. The efficiency of this block hadn't been so high in years.

There was a demonstration here of the effect of a day-after-day line of parked automobiles in reducing the capacity—no, the output—of a city street. In addition to the paving burden carried by many properties there has come the parking evil; one cutting down net earnings, the other keeping down gross revenue. Both crept into existence as a sort of by-product of changing conditions.

Automobile parking as a hindrance to the improvement of necessary car schedules has become a condition that limits the performance of the average city railway. The industry is beginning to take up the subject seriously, as evidenced by the prominent place given to it on a recent convention program. Several companies now provide "uptown" parking areas to reduce travel by automobile in the congested districts, thus literally co-ordinating the private automobile with their railway service. This is real progress. That electric railways may capitalize even the "ugliness of parked automobiles in city streets" has also been suggested. Merchants are finding by actual investigations that the number of their buying customers is not dependent on the number of automobiles parked near by; that their store business is not necessarily in proportion to their street congestion. This is encouraging.

Will Rogers has aptly visualized the parking problem of the automobile owner in a word picture of the business man who, after looking a couple of hours for a place to park and having found one, walked past his own home on his way downtown. This "philosopher in cap and bells" can find food for thought in the paradox of parking idle automobiles on the most used space in a city space that is dedicated to the public good and set apart for the business of transportation. So can electric railway operators. So can city officials.

Atlanta Successfully Solving Its Local Transportation Problems

The Company's Contribution Is Improved Service Through Modern Cars and Buses—The City Eliminated Jitneys and Has Approved Request for Fewer Stops—By This Co-operation Atlanta Is Entering a New Transportation Era

ELECTRIC railway history has been made in Atlanta during the last five years. By a combination of circumstances it has been a city where solutions had to be found for a number of serious local transportation problems. The situation was met in a courageous spirit and with the firm belief that there could be no successful substitute for the electric railway system; hence that its preservation and improvement were as important to the city as to the owners of the property.

Final results are not yet available because the program of rehabilitation is still under way. However, enough has been accomplished to show that while the railway in Atlanta is not yet on an entirely self-supporting basis, it is serving the public of that city far more efficaciously and efficiently than it has for many years. Particularly gratifying have been the results obtained by the change from old to modern cars. Atlanta will always be handicapped to some extent in its transportation by its irregular topography and the narrowness of many of the principal downtown streets, but great advances have been made toward better local service during the past two years, and others are under way.



Alanta Also Has a Flatiron Building. It Is at the Corner of Broad and Peachtree Streets

The improvements outlined were initiated none too soon for the needs of the city. Atlanta is growing rapidly and next to New Orleans is the largest city in the states which lie south of the southern boundaries of Virginia, Kentucky and Missouri. The population of Atlanta in 1910 was 154,836, and in 1920 it was 200,616. Within the 7-mile zone the population in 1920 was 228,762.

As with other large cities in this country, the electric railway system in Atlanta suffered from the high cost of labor and materials during the war. The financial results in 1920 and 1921 were fairly good, but earnings began to fall off in 1922 until the net in 1924 was less than 77 per cent of that in 1921. All through this period the railway company was alive to the difficulties it was facing, and tried whatever means it could to help the situation. A fare change from 5 cents to 6 cents in April, 1919, and from 6 cents to 7 cents in October, 1920, failed to give relief. The company decided that to begin litigation for a fare high enough to pay an equitable return would injure its public relations and do more damage than good. Instead, it decided upon a course of informing the public of what was causing the financial difficulty, hoping in this way to reach a more desirable solution.

Negotiations with City

Among the first steps in this program of informing the public was a petition presented by the company and filed with the Mayor and General Council of the city on May 11, 1923. In this petition the company specifically stated that it attributed its poor financial condition to the fact that automobiles had taken part of the natural growth of the street railway business, that unregulated jitney competition had been making a heavy inroad on the company's revenue, and that intolerable conditions and poor methods of controlling street traffic and unlimited parking were causing the railway considerable expense because of the delays in operating cars. In addition to these handicaps the greatly increased cost of materials and labor caused operating expenses to rise from a fraction over 50 per cent of the gross revenue in 1909 to 72 per cent of the gross revenue in 1922.

At that time the company stated there was a great need for improvement to the street railway system; new track and new cars were required, and the addition of a high-class bus transportation system would be necessary to supplement the street railway. But the company declared it would be unable to effect these improvements which were necessary to keep pace with the city's growth unless it had a reasonable opportunity to earn a fair return.

This petition was followed by another one on Dec. 1, 1923, when the company suggested the definite remedies which are outlined below:

1. Complete elimination of jitneys from streets upon which street cars are operated.

2. Renewed and effective enforcement of regulation of street traffic.

3. A 10-cent cash fare on street cars; tickets to be sold at the existing rate of 6⅔ cents. In other words, car riders who bought tickets would pay no increase in fare.

4. A 2-cent charge for transfers.

5. Reasonable revision in the operating routes of the cars in the interest of more efficient operation.

6. Elimination of unnecessary car stops to effect quicker street railway service.

7. Relief to the extent necessary from paving charges and gross receipts taxes.

This petition also said that "the above changes, only to the extent necessary, are asked for the purpose of putting and keeping the street railroad on a living basis in the interest of the public and as a simple act of justice to the owners who built and paid for the system."

This petition was followed by a series of public meetings in which representative citizens expressed their views and offered definite suggestions for a means of settling this difficulty. It was finally decided that the most satisfactory solution would be to have an impartial investigation made of the entire local transportation situation by disinterested, outside experts of national reputation. The company agreed to pay the expense of such a survey of the city. The city of Atlanta, through its special traction committee, selected the Beeler Organization of New York for this work. This organization began work in the latter part of February, 1924, and submitted its report to the City Council on Dec. 16 of the same year. Abstracts of this report were published in the issues of this paper for Jan. 10, Jan. 24, and Jan. 31, 1925.

This report was accepted by both city and company as a basis for the important changes which have followed. The example thus set of teamwork in behalf of better transportation conditions and service is a notable one. Specifically, the greater part of the recommendations in this report have been carried out, or will be shortly. Thus, part of the rerouting proposed has to await the construction by the city of certain new viaducts. Authority for wider spacing of car stops to an average of about six per mile in the outskirts of the city and eight in the central district has been approved by the City Council, but must still receive the sanction of the Public Service Commission. The Mayor of Atlanta has recently appointed a committee to consider the following requests of the company: The elimination of paving charges; a reduction in the gross receipts tax, and a change in fares from the present 7-cent cash fare with three tickets for 20 cents to a proposed 10-cent cash fare with three tickets for 20 cents, and if this is not enough, an increase in the ticket rate to three for 25 cents.





A Great Many of the Streets in Downtown Atlanta Are Narrow and Lined with Tall Buildings

Principal Changes Made

Briefly, the principal improvements made in whole or in part during the past two years to improve transportation conditions in Atlanta may be enumerated as follows:

1. Elimination of jitneys.

2. Purchase of a number of modern double-truck, one-man cars for city service and improved rolling stock on the interurban lines.

3. Addition of a fleet of motor buses which are used in co-ordinated service with the trolleys.

4. Construction of island platforms at a number of points in the center of the city.

5. Correction of an anomalous fare situation on two suburban lines, due to the fact that because of an ancient franchise the through fare has been 5 cents, or less than the local city fare in Atlanta.

6. Better control of traffic at congested intersections.

7. Rerouting of certain lines to obtain better service and faster and more economical operation.

8. Elimination of a few parallel lines.

An effort will be made in this issue to cover all the points mentioned above with the exception of that of improved rolling stock. That story is so important and carries so many suggestions to other companies that it will be made the subject of a separate article. In a later issue, also, an account will be given of some very interesting features of transportation practice of the company, as carried out under the direction of William M. Casey, superintendent of transportation.

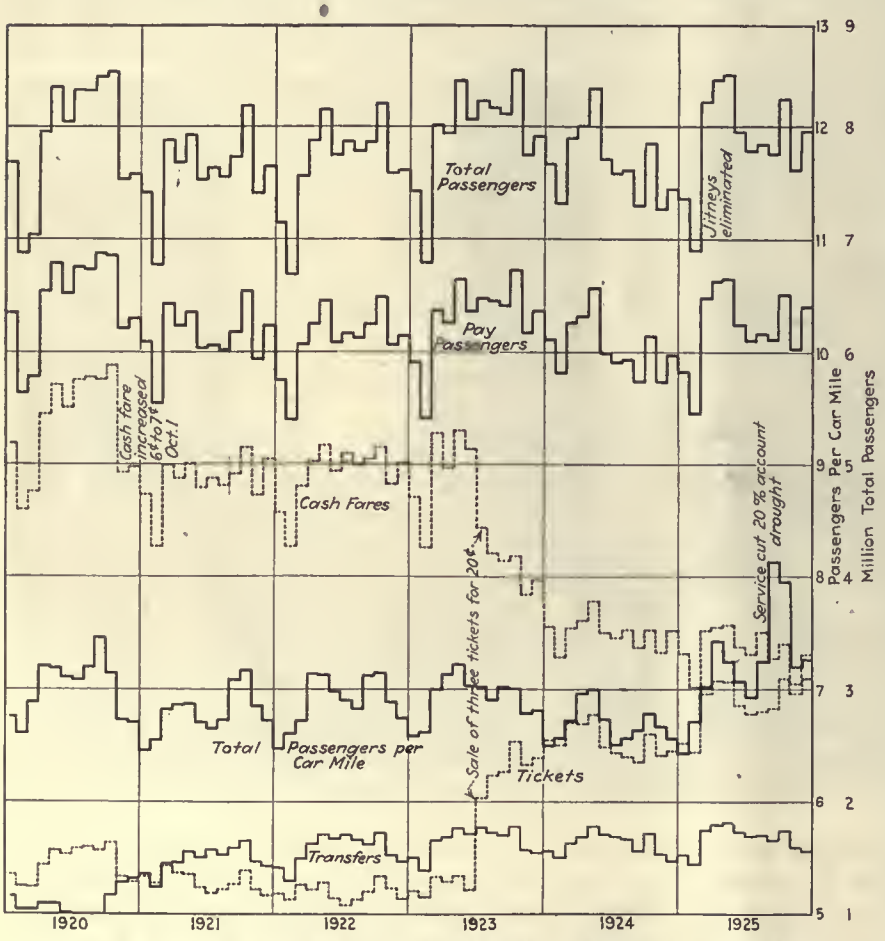


Chart Showing Classification of Passengers and Passengers per Car-Mile per Month for Last Five Years

Prior to April 14, 1919, the fare in Atlanta was 5 cents. On this date it was increased to 6 cents. On Oct. 1, 1920, it was increased to 7 cents cash, with fifteen tickets for one dollar. On July 1, 1923, the ticket rate was changed to three for 20 cents. These city rates do not apply on certain suburban lines where an extra charge is made or on two others where a low rate had to remain because of an old agreement.

Elimination of Jitneys

One of the first steps in the improvement of Atlanta's transportation was the abolition of the jitneys. This was accomplished very simply by a vote of the City Council not to renew any jitney licenses when they expired on March 1, 1925. It is estimated that during 1924 from 6 to 9 per cent of the total revenue passengers carried in the city traveled by jitneys and that their passenger revenue for that year was about $500,000. In practically every case these lines were competing directly with the street railway lines.

It was found that in most cases the railway service was sufficient to handle the jitney patrons and that they could be cared for with very little increase in car service. In return for the elimination of the jitneys the company agreed to put in several bus lines, as will be mentioned later in this article.

The elimination of the jitneys was followed by an increase in traffic on the car lines as shown by the gain in passengers carried from an average of about 7,670,000 per month in 1924 to an average of about 7,880,000 in 1925 and also by the much better form of the passenger line during the latter part of 1925, as given in the accompanying chart. There was also a great improvement in traffic conditions on the streets in Atlanta, as the jitneys paid very little attention to traffic regulations, and while they were on the streets were a continuous menace to the safety of persons walking or riding in other vehicles. There have been fewer street accidents and less street congestion in Atlanta.

Parking and Traffic Regulations at Crossings

Most of the streets in the downtown district of Atlanta are so narrow that the regulation of parking is an important matter. At present there are very few parking restrictions in the city. Where parking is not permitted the curbs are painted red, but this color will be changed to yellow so as to be more conspicuous. In an effort to improve conditions the Safety Council of Atlanta, with an associated committee of the national engineering associations, is making a study of the whole subject of street regulation and parking. The department stores have been asked by this joint committee to find out how many customers come to their stores. The City Council is considering prohibiting parking on one side of two main north and south and of two main east and west thoroughfares.

Traffic at the most congested crossings is now controlled by traffic signals which work synchronously, but their net result has been to slow down traffic. The average speed of the electric railway cars in the central business district is slightly under 5 m.p.h., whereas with traffic control under individual traffic officers, the average running time was 6.7 m.p.h. The period of the synchronous signals originally was 55 seconds for the main streets and 50 seconds for the side streets, with a four-second interval. This produced such a great slowing up of traffic that these times were cut to 30 seconds and 25 seconds respectively with a four-second interval. This shortening of the time interval

has improved conditions somewhat, but the passage of a car through the central business district still takes 25 per cent more time than before the synchronized system was introduced. A study is now being made of the co-ordinated system of crossing signals used in Chicago.

The construction of island platforms has helped the loading problem in the center of the city and has also undoubtedly helped to speed up vehicular traffic as there is now less interference between pedestrians and vehicles. Six of these island platforms have already been built at important loading points and the company has an application for permission to construct three more.

Twenty-five Buses Now in Operation

The Georgia Railway & Power Company now has 25 buses, the latest purchased being Fageol gas-electric, with longitudinal seats on the upper deck. This upper deck is covered by an adjustable awning.

The first bus line to be operated by the company was one already in service, serving a real estate development. At the time the City Council decided to abolish jitneys the company agreed to take over these buses from the real estate company and continue to operate them. These buses, which are Mason Road Kings, do not run to the center of the city but are used as feeders to the car lines. They operate from the terminus of the car lines through the real estate developments. On these a 5-cent fare is charged where a transfer to the street railway is not wanted, but a 10-cent fare is charged when a transfer ticket is requested. This transfer ticket is accepted as cash fare and transfers to other lines are given on its presentation.

The gas-electric coaches operate to the center of the city and on these a straight 10-cent fare is charged with no transfers. The seating capacity of these buses is 60 passengers, 21 on the upper deck and 29 downstairs. The bodies are painted an attractive shade of red with cream from the middle upward. The seats on the lower deck are of leather upholstery.

Six-cylinder Hall-Scott engines are used, connecting with G. E. generator and exciter units. The driving equipment consists of two G. E. motors mounted on the chassis. The transmission in the rear consists of two underslung worm drives, and no differential is used. The controller has five points: Reverse, neutral, series, parallel, and regenerative braking. In addition, all coaches are equipped with Westinghouse air brakes, pneumatic door engines and all other modern safety features.

Air pressure is obtained by a special compressor pump geared to the engine and connected to two service reservoirs and is transmitted to the rear wheelbrake drums through two diaphragms supported on the rear axle housing and connected to the operating levers. Soft steel shoes expand on application of the air pressure against the inner side of the brake drum. The emergency brake, which is operated by hand, uses the same brake shoes and brake drums as the air system.

One-man operation is used on the buses, and all passengers enter at the front door. Both front and rear doors are used as exits, and both are operated from the driver's seat, though the rear door also can be operated from that end of the bus. The stairs leading to the upper deck are inclosed and passengers for both decks enter through the front door.

Operators for the buses were selected from street car trainmen of good record and long experience. They are paid 5 cents per hour more than the street car trainmen and are instructed in their duties at a special school conducted under the direction of the superintendent of employment and instruction.





Gas-Electric Double-Deck Buses at a 10-Cent Fare Have Been Added to Supplement the Car Service

The rule is followed of "a seat for every fare," and no standing is permitted on either deck under any conditions. The buses do not stop after the seating capacity is filled except to discharge passengers. Smoking is permitted on the upper deck. Because of climatic conditions in Atlanta, comfortable riding on the upper deck may be expected for eleven months of the year.

All of the buses are operated by the Atlanta Coach Company, a subsidiary of the Georgia Railway & Power Company, which is planning to build a garage to house 30 buses at a cost of about $55,000.

Forward-Looking Policy Justified by Results

It is satisfactory to be able to report that the liberal forward-looking policy followed by the company is showing results in greater revenue and lower operating costs. With the other improvements proposed it is expected that the railway, while not a bonanza, will pay a reasonable return on the investment.

The revenue during the last six months has shown an average increase of about 10 per cent.

The principal reductions in operating expenses have

come from (1) rerouting, (2) use of modern cars, (3) improved schedules and (4) Economy meters.

All of the proposed rerouting, as explained, has not yet been put in force, because much of it has had to await the completion of two viaducts to be built across the railroad cut which divides downtown Atlanta. Nevertheless, some rerouting had been carried out and some trackage has thereby been made unnecessary and so has been taken up. It is estimated by the company that the rerouting already adopted has effected an annual saving of 627,706 car-miles. This, at 26 cents a car-mile, amounts to $173,203.

The saving from the company's recent one-man cars will be discussed more fully in a later article on this subject. It is sufficient here to say that the total savings from the 60 new cars ordered, in lower maintenance, power and transportation expenses, together with that gained through their larger capacity, increased speeds and reduced accidents, is estimated to be yearly $210,142. This represents about 25 per cent of the cost of the cars.

The gain from improved schedules comes principally from higher speed and better car loading during the non-rush hours. The latter point is illustrated by the very marked improvement in the "passengers per car-mile" line in the chart on page 794, although much of this improvement can also be attributed to the larger cars now used. Perhaps the best way of illustrating the gain made is to cite the greater expense which would have resulted with the same traffic if the conditions of earlier years had prevailed. Thus, if the 1925 passengers had been hauled under average 1923 carload conditions, 140,000 additional car-hours would have been required, which at 1925 platform expenses would have amounted to $152,000. In this comparison, 1923 is taken instead of 1924, since the conditions of 1924 were unusual because of jitney competition. Again, if the 1925 passengers had been hauled under 1923 speed conditions, 80,600 additional car-hours would have been required, amounting at 1925 costs to $86,700. This gain was not all net, as part of it came from larger cars and part of it from higher speeds, the cost of both of which should be deducted from the gross gain mentioned to secure the net gain. Thus, the better loading on larger cars, it is estimated, cost $33,000, whereas the net gain would be shown by the deduction of this figure from the gross gain or $152,000, making the net gain $119,000. In the same way, the increase in speed cost $39,000, which, deducted from the gross gain $86,700, gives a net gain of $42,700.

It is too early yet to state the exact benefit to be expected from the use of Economy meters, with which all of the double-truck cars are equipped. During the first month a saving of about 7 per cent was obtained. This corresponds to somewhat more than $40,000 a year. As the instruction of the platform men progresses, this gain should increase.

Gains in Future Changes

Other gains hoped for by the company to place the railway on a self-supporting basis are elimination of paving charges, a reduction in the gross receipts tax, and an increase in fares. The new schedule of fares requested by the company, as explained, is an increase of the cash fare from 7 cents to 10 cents plus an increase of the ticket rate from three for 20 cents to three for 25 cents if necessary.

The city has no control over the fares on the two suburban lines mentioned. Up to within a few months these lines presented the anomaly of charging a fare of only 5 cents, or 2 cents less than that on the local city lines. The public service commission was powerless to correct this situation and the courts refused to do so because of a clause contained in an old franchise.

About six months ago the company was able to effect an arrangement with the authorities of the principal city on one of these suburban lines, College Park, by which an increase in fare to 7 cents was obtained. It is hoped that the public in Decatur, the principal city on



In Cold Weather Awnings Are Not Used on the Upper Deck

the other suburban line, will realize, as have the people in Atlanta, that their true interests lie in allowing the railway serving their community to have a living fare.

PUBLIC INDORSES COMPANY'S POLICY

It is generally difficult actually to appraise the real sentiment of the public in regard to policies followed by a public service corporation. Of course, it is usually easy to sense general approval of markedly conspicuous improvements like the addition of new, well-furnished cars. But conditions differ when the addition of new cars is accompanied with increase in fare, change from two-man to one-man operation, elimination of jitneys, requests for skip-stop service, still higher fares, relief from paving charges and other changes which really mean better service to the public, but whose immediate public benefit is not quite so apparent as the new cars. However, in Atlanta there is striking evidence that the public of Atlanta stands back of and indorses the efforts of the Georgia Railway & Power Company to rehabilitate its city system and put it on a paying basis. This is shown in many ways, but perhaps no more significantly than by the following incident:

Last year the *Georgian-American*, one of the Hearst chain of newspapers, announced it would present a cup to "Atlanta's most valuable citizen," and the responsible duty of selection was assigned to representatives of the city's leading civic organizations and of the city and county governments. This committee, after an exhaustive consideration of the subject, awarded the cup to H. M. Atkinson, chairman of the board of the Georgia Railway & Power Company, for the reason that: "He did more during the year in establishing a new industrial era in the region of which Atlanta is the center; more in promoting a higher standard and happier conditions of living, and was more directly responsible for Atlanta's steady growth, through the creation and operation of one of the greatest transportation systems in the country, than any other single agency."

In its report the committee cited, among other improvements made during the year by the Georgia Railway & Power Company, that it had purchased 60 new street cars of the most modern type, had established motor bus lines, operating fifteen new modern double-deck motor coaches, and had greatly improved practically all existing street railway lines.

There is no doubt that the chief officer of the local railway system often is a city's most valuable citizen. But it is none the less satisfactory to have this fact recognized during the lifetime of that citizen and that it should receive such general approval, as was the case in Atlanta.

New Uniforms for Trainmen a Cleveland Innovation

RALPH W. EMERSON, general manager of the Cleveland Railway, saw no reason why new uniforms should be adopted only when the type of vehicle should be changed. Besides, he never could understand why blue, one of the hardest colors to keep clean, should have been adopted in the first place.

For this reason he experimented with several types of uniforms, had samples of each made up, dressed up a few conductors and motormen in the different sample suits and sent them around to the various stations so that the trainmen might vote on the types they preferred. Decision was made, after this vote, for the same general design or cut, made up, however, from gray whipcord cloth, with nickel buttons.

The company has arranged to have these suits made by one manufacturer and sold by one retailer. The uniforms will be adopted gradually as the trainmen require new suits. On each new uniform the company absorbs a certain portion of the cost of the uniform, and also gives the trainman a new cap, reducing the cost of the new outfit to the trainmen to about $25.

To help in the maintenance of the uniform in a neat and tidy manner, the company has installed two tailoring shops, one at the Superior station and the other at Dennison. Pressing, mending and repairs of uniforms are done without charge to the trainmen.

Freight Development on Aurora-Elgin Line

Active Solicitation Has Brought Much Local Business —Shipments Are Interchanged with Eight Steam Railroads—L. C. L. Business Increased

DEVELOPMENT of freight business in the last three years on the Chicago, Aurora & Elgin property has been rapid. Freight revenues in the twelve months ended Nov. 30, 1925, were $311,188, as compared with $126,546 in the year ended May 31, 1922, an increase of 146 per cent during a period of approximately three years and six months. Car load freight earnings increased from $71,980 in the twelve months ended May 31, 1922, to $237,204 in the twelve months ended Nov. 30, 1925, an increase of 230 per cent, while less than car load earnings in the same period increased from $54,566 to $73,984, an increase of 36 per cent. This increase in freight revenues is in part accounted for by the rapid growth of the territory, but is largely the result of the intelligent and unremitting work of the management.

In consequence of close co-operation established with the real estate interests and municipal officials the traffic manager of the railroad was notified immediately of any construction work in the territory. When the municipal officials of a town decided to construct a concrete highway, that fact, along with the name of the successful contractor, was communicated to the traffic department, which at once got in touch with the contractor for the purpose of arranging to have all construction material shipped over the Aurora-Elgin. In most cases the municipal officials have been willing to co-operate by indicating to the contractors that they would be glad to have the local line favored. In the same way the real estate interests and suburban developers, before the beginning of each construction season, almost without exception have been willing to advise the traffic manager of the number of houses which they contemplated erecting and the names and addresses of the contractors who would handle the work. These shippers of material have been canvassed to secure the resultant freight business.

With the rapid growth of the suburban communities along the line came coal and lumber yards, builders' supply depots, gasoline distributing stations, etc. The traffic department of the railroad was energetic in calling attention to the possibilities for the establishment of such enterprises and in arranging to have them located adjacent to the Aurora-Elgin line. In many

cases this was done upon land owned by the company, which was leased at a rental rendering a reasonable return upon the value of the property and usually with stipulations in the lease requiring the lessee to ship all or a stipulated proportion of his freight over the electric railroad. From time to time the railroad has built temporary sidings and team tracks for the purpose of accommodating road contractors or others having occasion for a limited period of time to ship a large amount of freight to some particular point.

The Elgin branch of the company's system runs through a country underlaid in large part with gravel. Prior to the organization of the present company several gravel companies had established plants on this branch. A substantial part of the increase in car load earnings has been the result of the activities of the traffic department in co-operating with these gravel companies in the extension of their sales as well as in fostering the establishment of other gravel enterprises upon this branch of the company's system.

Interchange of freight is made between the Chicago, Aurora & Elgin Railroad and the following steam railroads: Baltimore & Ohio, Chicago Great Western, Soo Line, Indiana Harbor Belt, Chicago & Northwestern, Elgin, Joliet & Eastern, Illinois Central and Chicago, Burlington & Quincy. In addition the company interchanges freight with the Elgin & Belvidere (which, in turn, connects with the Rockford & Interurban, making possible a through route from Chicago to Rockford), and with the Aurora, Elgin & Fox River Electric Company. A daily freight service is now operated in both directions between Rockford and Chicago.

The company is a member of the Central Freight Association, having the same status therein as the other railroads operating in the same territory. Joint tariffs are in effect covering practically every class of commodity moving in this territory. Through these interchange connections the Aurora-Elgin has been able to build up a profitable business as a terminal road in distributing car load freight to the various communities which it serves.

The following figures show the make-up of the more important classes of car load business and the growth in the revenues during less than three years time:

	Year 1922	Twelve Months Ended Sept. 30, 1925	Per Cent Increase
Coal	$14,849.18	$19,617.17	32
Gasoline	12,672.12	19,553.30	54
Coke	836.24	4,045.21	384
Crushed stone	5,527.57	10,419.55	89
Cinders	8,981.30	14,280.08	59
Sand and gravel	32,172.45	143,099.89	345
Cement	177.25	5,289.96	2884
Lumber	132.87	979.41	637

The growth in the volume of car load freight has required the expansion of the interchange facilities with practically every steam railroad with which connections are made and the enlargement of practically every team track siding in the suburban belt. All of the interchange business is handled in standard steam railroad equipment, which is rented on a per diem basis. A large part of the company's local business is also handled in steam railroad equipment, similarly leased. The growth in car load business has been particularly gratifying to the company because it is more profitable than the average run of l.c.l. business. Car load freight is handled entirely by electric locomotives. Less car load freight is handled principally by motor express cars.

In 1924 an arrangement was effected with the Chicago Tunnel Company under which the facilities of this underground system of freight delivery to a large part of the wholesale and retail district in Chicago was made available for the use of Aurora-Elgin shippers. The advantages to department stores, retail establishments, wholesale houses, etc., in shipping freight to points in the Aurora-Elgin territory over the Tunnel route and thence over the Aurora-Elgin—particularly the advantage of over-night delivery as compared with the slow movement of freight by the steam railroads—was called to the attention of shippers by personal letters, printed literature and personal canvasses by representatives of the traffic department. The volume of business handled in this manner is growing. The company is gratified at the progress which it has made in the development of l.c.l. business in the face of the rapid expansion in the network of improved roads throughout the territory which it serves and the growing use of private motor trucks in door-to-door deliveries.

For the purpose of taking care of the rapidly expanding l.c.l. business, new freight stations have been erected in Aurora and Elgin and the existing freight stations at a number of other points have been enlarged. The rapid growth in business has since required the enlargement of the Aurora station and the installation of an additional team track. In connection therewith and as a means of improving the passenger service out of Aurora, the company purchased a substantial area of land lying between the Fox River and North Broadway and relocated its line upon private right-of-way, taking approximately ½ mile of track out of the street. This materially reduced the liability to accidents through collisions with vehicles and increased to some extent the ability to make fast schedules, while giving additional space for the enlargement of freight facilties and taking care of future requirements with respect thereto.

New Passenger Stations for North Shore Road

TWO new passenger stations are planned for the Chicago, North Shore & Milwaukee Railroad, one at Mundelein and the second at Winnetka.

The Mundelein station will conform with the standard design recently adopted for North Shore Line stations, green tile roof, tapestry brick, white stone trimming, combining beauty of design with permanency of construction and providing every modern convenience for the public.

The Winnetka station, work on the foundation of which has already begun, will be at one of the most important business locations and will be built flush with the street on two sides and the track on a third. Because of the dimensions of the lot it will not be rectangular, but will conform in other details with the other stations.

Cement platforms to accommodate longer trains have already been completed at the Winnetka station site. These new platforms will also eliminate the blocking of the principal street of the village by trains stopping at the station.

The interior walls of the stations are to be of the same materials as the exterior, with terrazzo marble floors and green marble borders and base. The interior woodwork will be of forest green oak and the decorations light in color to provide maximum reflected light.

The Mundelein station will cost approximately $50,000. It will be ready for business by June 1, 1926.

Energy Saving Campaign Nets $110,000 in Seven Years

Seattle Municipal Street Railway Has Reduced Energy Consumption from 4.48 Kilowatt-Hours per Car-Mile to 3.62—Charts Showing Records of Individual Motormen Are Used to Good Effect—The Clerical Work Is Not Burdensome

By S. E. Goodwin
Supervisor of Power Seattle Municipal Street Railway

IMMEDIATELY after the acquisition by the city of the street railway lines in Seattle in April, 1919, it was decided to equip 380 cars with Economy meters and institute an energy-saving campaign. During the time meters were being installed two instructors, picked from the ranks, were sent out to ride with the motormen and point out the habits and practices through which energy was being wasted and to demonstrate methods of saving it. The men were shown by stopwatch tests over measured track lengths that by proper acceleration and braking a car can be allowed to coast a large portion of the distance and arrive at the starting point in as short a time as if full power had been kept on up to a point where it was necessary to make an application of the air brakes.

Diagrams were posted at the carhouses showing two methods of bringing a car to a stop. In one the motorman keeps his controller in the full multiple position almost to the stop, then throws power off and immediately applies the air, often stopping too suddenly for the comfort of his passengers. This is one of the most wasteful practices that has been observed in street railway operation.

The other method is to accelerate quickly, throw off the power after the car has attained proper speed and then coast down to a low speed from which a stop can be made quickly by application of the air. This not only saves energy but reduces wear on brake shoes without loss of time.

Bulletins are posted from time to time directing special attention to coasting wherever possible, proper feeding of controller, correct manner of braking, explanation of electrical terms and other matters of energy-saving interest.

Motormen are required to fill out record cards of the type shown in an accompanying illustration. Meter readings at start and finish of run and leaving times at each end of line are recorded on the card. Mileage and kilowatt-hours are then figured and charts made up in the general office and sent out to the various carhouses.

Several methods of notifying motormen of their ratings have been tried, but the one now in use, the colored line method, originally developed in San Diego and used also by the Denver Tramway, has proved most satisfactory. Charts are posted each week show-

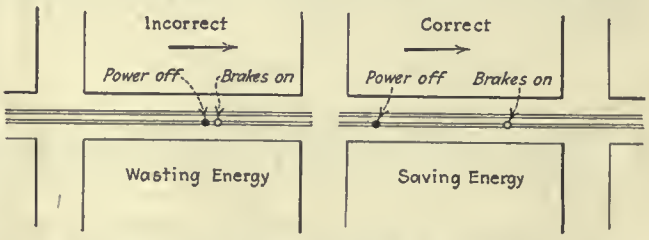
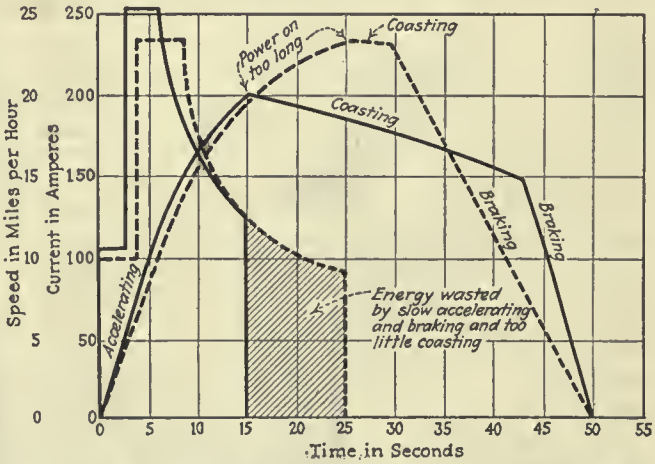


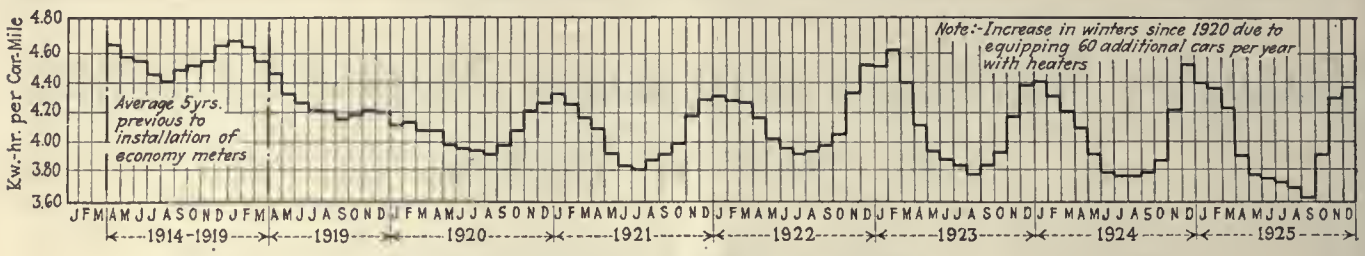
Diagram Posted in Carhouse to Show Motormen Right and Wrong Methods of Stopping Cars



Speed Time Energy Curves Used to Illustrate to Motormen the Principle of Energy Saving Possible with Increased Coasting

RESULTS OF ENERGY-SAVING CAMPAIGN, SEATTLE MUNICIPAL STREET RAILWAY

	Capital Charges			Operating Charges				Saving			
Year	Interest	Depreciation	Total	Instruction and Cash Prizes	Clerical and Stationery	Maintenance	Total	Kilowatt-Hours per Car-Mile	Miles	Gross Saving	Net Saving
1919	$ 428	$1,083	$1,511	$3,145	$4,350	$1,095	$8,590	0.096	11,774,219	$11,303	$1,202
1920	1,083	1,444	2,527	1,785	5,334	1,572	8,691	0.261	15,231,039	39,753	28,535
1921	1,083	1,444	2,527	.....	4,062	1,690	5,752	0.211	14,788,174	31,203	22,924
1922	1,083	1,444	2,527	.....	3,520	1,610	5,130	0.082	14,761,383	12,104	4,447
1923	1,083	1,444	2,527	.....	3,560	1,650	5,210	0.103	15,412,447	15,875	8,138
1924	1,083	1,444	2,527	.....	3,680	1,690	5,370	0.149	15,383,290	22,921	15,024
1925	1,083	1,444	2,527	.....	3,550	1,725	5,375	0.247	15,294,249	37,777	29,875
Total	....	.....	$16,673	.....	$28,060	$11,032	$44,118	.....	.....	.....	$110,145
Per meter			$43.87	.....	$73.84	$29.03	$116.10	.....	.....	.....	$290
Per meter per year			$6.49	$1.98	$10.93	$4.30	$17.20	.....	.....	.....	$43



Energy Consumption at Switchboard 1914-1925

ing individual records on three or four lines, the period between postings of the same line averaging six weeks. A typical chart is reproduced herewith. Heavy vertical lines represent the average energy per car-mile at the car and the individual records are shown by horizontal shafts, blue areas to the left indicating energy saved and red areas to the right showing energy wasted. The purpose of the chart is to make the men whose records appear on the right of the average line improve their work. Those whose records indicate wasteful use of energy are given special instruction. There are three groupings for each line, day runs, swing runs and trippers and night runs. When two or more types of cars are used on the same line the individual kilowatt-hours are adjusted to correspond to the energy consumption of a standard type.

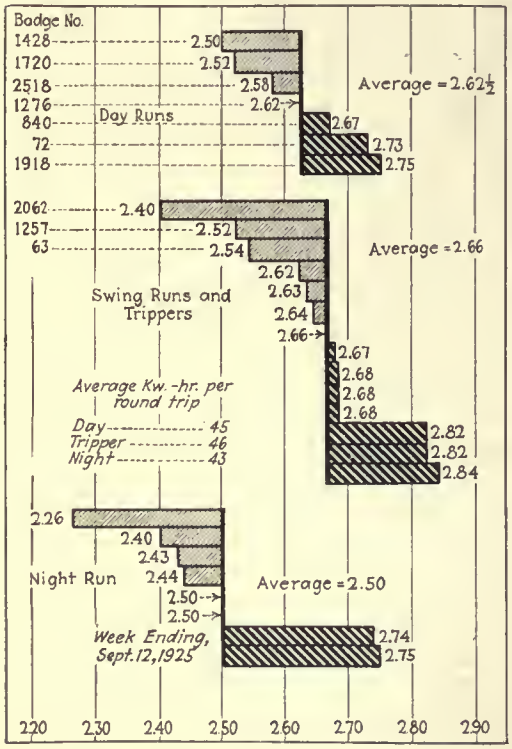
Substantial Savings Effected

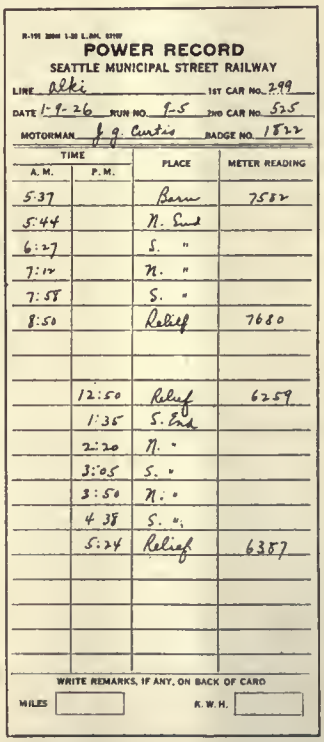
Yearly savings are calculated on the average of two years immediately preceding the start of the energy saving campaign. This base is 4.316 kilowatt-hours per car-mile at the switchboard. This is lower than the five-year average because of certain abnormal years prior to 1917. Due to a decrease in passengers per car-mile since 1919, a normal decrease in energy consumption has followed and a compensating factor has been allowed. An adjustment has also been made because of the electric heaters added to 60 cars in 1920.

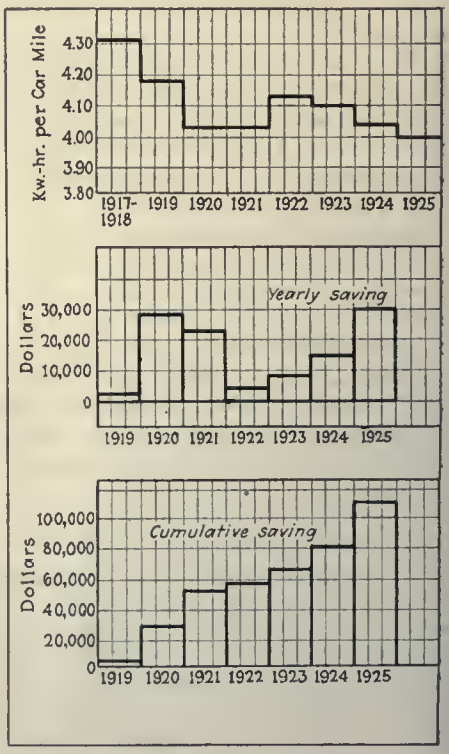
A graphical record of kilowatt-hour consumption per car-mile for each month since April 1, 1919, as compared with the average five years previous to the city's taking over the lines is presented on this page. It will be noticed that despite the extra heating each winter during the past five years the peaks are not as high as that of the 1915 to 1919 average and the valleys show a steady decline. In September, 1925, the consumption per car-mile was 3.62, as against 4.48 the average September consumption for the five years previous to installing Economy meters.

Yearly savings in dollars and cumulative savings are shown in other charts. These show an average yearly saving of more than $16,000 for the seven-year period 1919-1925 inclusive and a cumulative saving of approximately $110,000.

Since the adoption three months ago of the colored line method of advising motormen of their individual records, the results accomplished in energy saving have been particularly encouraging. Moreover, the superintendence overhead is small. Since 1920 the office force has consisted of a supervisor of power and two assistants, whose duties, other than energy saving, occupy about half of their time.







At Left, Chart Comparing Individual Energy Consumption Record of Motormen. In Center, Seattle Motormen Are Required to Fill Out Cards Showing Meter Readings at Start and Finish of Run and Leaving Times of Trips. At Right, Reduced Kilowatt-Hour Consumption per Car-Mile Has Resulted in Substantial Savings



Middlesex & Boston Bus at Lexington on the Original Route Running from Concord to Arlington

Bus Service Expanded in Middlesex

Substitution of Buses for Cars on Three Routes by the Middlesex & Boston Street Railway Has Resulted in Increased Riding—Present Operation Is More Regular and More Flexible than that Formerly Given on Single-Track Lines—Equipment Has Been Standardized

COMPLYING with a request made by the cities of Waltham and Newton, the Middlesex & Boston Street Railway, Newtonville, Mass., during the past year has substituted buses in place of cars on three of its lines. Prior to the change on these lines the railway had already undertaken bus operation on two of its routes. Experience obtained during the fifteen months of operation of the first two routes and during the shorter period since the new routes were established indicates that the change will result in improved transportation service and will benefit both the public and the company.

Bus operation was first undertaken by this railway during the latter part of 1924, as told in ELECTRIC RAILWAY JOURNAL for Dec. 6, 1924, p. 955. The original lines were from Concord and Billerica to Arlington along a route 17 miles in length, and from Wayland and Framingham to Natick along a route 10 miles in length. Both of these bus routes replaced single-track car lines.

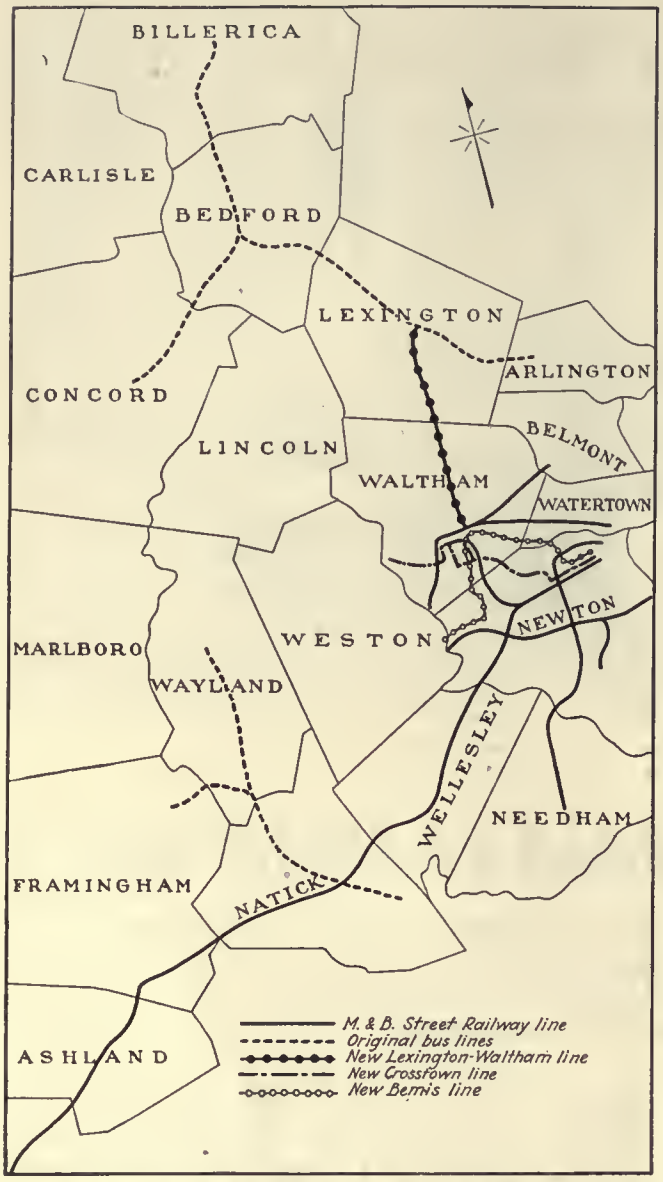
During the summer of 1925 the company had to suspend car service on the line between Lexington and Waltham due to the construction of a new sewer, necessitating the temporary removal of the railway track from the street. On July 16 the company inaugurated bus service along this route to take the place of the suspended car service. This has proved so satisfactory that bus operation has been continued since the completion of the sewer construction work.

Following the successful establishment of bus service in these instances, the cities of Waltham and Newton suggested to the company that a similar substitution should be made on other lines. A route from Newton Corner to Waltham, known as the Crosstown line, and another from Newton Corner to Auburndale via Waltham, known as the Bemis line, were considered by the management as the logical ones upon which to try the experiment.



Figured Gray Mohair Upholstery Gives a Pleasing Appearance to the Bus Interior

In many respects the bus operation on the three routes described has proved more pleasing to the public than the former car service. Schedule speed is the same as that formerly operated



New Bus Routes Between Newton Corner, Waltham and Auburndale and Between Lexington and Waltham Have Recently Been Established by the Middlesex & Boston Street Railway in Addition to the Original Routes from Concord and Billerica to Arlington, and from Wayland and Framingham to Natick

by the cars, but headways are more regular than it was possible to operate on these long single-track lines. A summary of the routes now operated, with their length, schedule speed and number of buses required, is given in an accompanying table. Plans for changing over other routes from cars to buses during the present year are under consideration by the company.

All bus lines operated by the Middlesex & Boston Street Railway are now carrying more passengers than were carried by the car lines which they have replaced. Fares are the same as the old car fares, 10 cents per zone with free transfers. Substitution was made at the beginning on the basis of one bus for one car, but it has been found necessary to augment the bus service so that on some lines the bus mileage is now approximately 30 per cent greater than the car mileage used to be.

Operating cost has thus far averaged somewhat under 30 cents per bus-mile, with operating revenue slightly in excess of that figure. Depreciation, included in the foregoing cost figures, is calculated on a basis of four years of life for the buses. Each bus averages about 40,000 miles per year, making the total life thus calculated 160,000 miles.

The railway has standardized its bus equipment, using White chassis and Bender bodies. It has ten buses seating 23 passengers, two seating 25, and 22 seating 29, making a total of 34 vehicles. Seventeen of the latest buses are upholstered in gray figured mohair, as shown in an accompanying illustration. A number of other interesting features have been incorporated in the design. Wireglass is used in the rear windows to do away with the need for protecting rods. Cloudy glass is used in the upper window sash. This prevents the sun shining through the windows into the eyes of passengers and renders window curtains unnecessary. Straps for standees, while not included in the original design, have now been installed at the request of the public. The company has also standardized on Seiberling tires.

Buses are housed in three garages, at Waltham, Lexington and Natick. These are parts of the existing carhouses. The old pits have been filled in and concrete flooring laid. Of these the largest, at Waltham, is now housing sixteen buses. The second largest is at Lexington, from which thirteen buses are operated, and the smallest is at Natick with five buses. The amount of service operated varies slightly from time to time, depending on weather conditions, etc., but it is the practice to have nearly all of the buses on the road in the rush hours.

BUS ROUTES OF MIDDLESEX AND BOSTON STREET RAILWAY

Route Between	Date Established	Length, Miles	Speed, M.P.H.	Number of Buses
Concord, Billerica and Arlington...	September, 1924	17	13	10
Wayland, Framingham and Natick.	September, 1924	10	10	5
Lexington and Waltham.....	July 16, 1925	5	13	3
Newton Corner and Waltham.....	January 10, 1926	5	12	9
Newton Corner and Auburndale...	March 14, 1926	7	9½	7
Total.....		44		34

During the severe snow storms of the past winter the buses were able to give somewhat better service than the cars. This was due to a large extent to the harmful effect of automobile traffic packing the snow in the grooves of the rail. Car headways operated by the Middlesex & Boston range from fifteen minutes to one hour. These were found to be insufficient to keep the track clear with snow falling as rapidly as it did during the February storms. This rapid accumulation also resulted in the stalling of snow-fighting equipment in deep cuts along private rights-of-way, thereby increasing the difficulty of keeping open the rail lines.

Snow removal from the streets on which the buses operate is carried out by the cities, towns and the state of Massachusetts. This is done in return for a license fee of $5 per bus seat. Although the first of the severe storms of the past winter caught both the municipal and railway snow-fighting organizations unaware, it was possible by energetic work to keep the bus routes open at all times.

The Chicago Surface Lines are "horseless." The last ten horses have been sold. They were the remnant of a force which has been steadily decreasing for 80 years. In 1893, the year of the Chicago World's Fair, the lines operated with 10,000 horses. In recent years a few have been kept for trucking or for drawing service wagons into the congested loop.

Depreciation an Important Factor in Baltimore Valuation

Cost to Reproduce New Less Depreciation Used as Basis for $77,000,000 Allowed the United Railways & Electric Company by Maryland Commission — Easements Were Included as an Element of Value

CONSIDERABLE attention was paid in the recent valuation of the United Railways & Electric Company of Baltimore to the items of depreciation and easements. In reaching the final figures, as published in this paper for March 13, 1926, page 459, the majority opinion valued the physical property, overheads, working capital and going value at $70,000,000 and the easements at $7,000,000. In the hearing of the case the United Railways claimed a total valuation of $106,641,360, to reproduce new, less depreciation, which included easements. Clarence W. Miles, people's counsel, conceded a value of $60,577,150, which did not include any allowance for easements. Mr. Miles opposed placing any value on the easements. In this Commissioner Harper concurred. The commission, however, received a ruling from the Attorney-General of the state holding that the easements should be included.

The principles on which the company's and the city's cases were based were given in an article by W. H. Maltbie in the issue of Jan. 9, 1926, page 69.

The majority opinion pointed out that in arriving at the figures the commission had considered the cost to reproduce the property new, the amount of depreciation existing in the property, or its per cent condition as of Jan. 1, 1924, original cost so far as that could be determined, and the par and market value of securities outstanding against the property.

The valuation placed on the various items by the people's counsel, the United and the commission are set forth in the majority opinion with an explanation of how each was arrived at. The individual items are given in the accompanying table, which was included as an appendix to the opinion.

In connection with the item of passenger and combination cars the commission said the people's counsel arrived at his cost of reproduction by applying to the

COMPARISON OF ESTIMATES OF PEOPLE'S COUNSEL AND OF RAILWAY COMPANY WITH FINDINGS OF PUBLIC SERVICE COMMISSION OF MARYLAND AS TO COST OF REPRODUCTION, PRESENT CONDITION AND GOING VALUE, BUT WITHOUT EASEMENTS, AS OF DECEMBER 31, 1923, OF THE PROPERTY OF THE UNITED RAILWAYS & ELECTRIC COMPANY OF BALTIMORE

	Account Physical Property	Cost to Reproduce New			Per Cent Condition			Cost to Reproduce New Less Depreciation		
		People's Counsel	Railway	Commission	People's Counsel	Railway	Commission	People's Counsel	Railway	Commission
502	Right-of-way	$167,576	$745,719	$248,573	100	100	100	$167,576	$745,719	$248,573
503	Other land used in electric railway operations	1,336,380	1,850,662	1,748,417	100	100	100	1,336,380	1,850,662	1,748,417
504	Grading	1,836,582	2,239,931	2,210,453	87.2	100	100	1,600,397	2,239,931	2,210,453
505	Ballast	1,752,803	2,093,940	1,967,588	95	84	80	1,665,163	1,758,910	1,574,070
506	Ties	1,292,828	1,537,461	1,435,507	65	84	80	840,338	1,291,467	1,148,406
507	Rails, rail fastenings and joints	3,422,424	4,050,495	3,849,014	72	84	80	2,464,145	3,402,415	3,079,211
508	Special work	2,514,331	2,993,016	2,814,396	67	84	80	1,684,602	2,514,133	2,251,516
510	Track and roadway labor	3,663,490	4,825,215	4,583,955	65	84	80	2,381,269	4,053,181	3,667,164
511	Paving	2,755,465	3,297,811	3,165,038	80	84	80	2,212,372	2,770,161	2,532,030
512	Roadway machinery and tools	119,842	119,842	119,842	70	70	70	83,889	83,889	83,889
515	Bridges, trestles and culverts	1,307,327	1,281,419	1,281,419	80	82	82	1,045,862	1,046,474	1,050,764
516	Crossings, fences and signs	88,983	97,094	88,983	87	89	87	77,415	86,601	77,415
517	Signals and interlocking apparatus	137,579	153,583	145,897	90	98	95	123,821	150,511	138,602
518	Telephone and telegraph lines	289	305	305	90	90	90	260	274	275
519	Poles and fixtures	1,138,441	1,338,820	1,195,363	85	91.5	90	967,675	1,225,020	1,075,827
520	Underground conduits	189,464	219,723	219,723	95	96	95	179,991	210,934	208,737
521	Distribution system	3,256,822	3,852,902	3,549,645	88	89	88	2,866,003	3,449,118	3,123,688
523	Shops and carhouses	4,207,565	4,441,435	4,350,000	71.3	93	87	2,997,029	4,127,027	3,784,500
524	Stations, miscellaneous buildings and structures	318,324	340,799	335,598	79.7	90.6	85	253,704	308,452	285,258
526	Park and resort property	489,272	608,574	510,877	73.7	90.6	80	360,593	551,190	408,702
529	Other expenditures—Way and structures. Trackless trolley construction	45,676	45,676	45,676	90	90	90	41,108	41,108	41,108
530	Passenger and combination cars	10,527,765	12,009,033	11,486,901	70	90	85	7,369,436	10,824,518	9,763,866
531	Freight, express and mail cars	39,322	52,094	49,829	50	90	80	19,661	46,885	39,863
532	Service equipment	477,729	454,148	487,237	55	80	80	262,751	363,318	389,790
533	Electric equipment of cars	5,747,935	6,087,930	6,087,930	70	90	85	4,023,554	5,479,137	5,174,741
536	Shop equipment	350,596	350,595	350,595	80	80	80	280,477	280,476	280,476
537	Furniture	270,721	270,720	270,720	80	80	80	216,577	216,576	216,576
538	Miscellaneous equipment	153,012	153,012	153,012	65	60	60	99,458	92,007	91,807
539	Power plant buildings	43,325	46,095	45,500	65	93	85	28,115	42,868	38,675
540	Substation buildings	448,061	478,810	473,822	81	93	85	363,891	445,293	402,749
542	Power plant equipment	169,972	169,972	169,972	70	76	70	118,980	127,479	118,980
543	Substation equipment	1,837,859	1,837,859	1,837,859	85	92	90	1,562,180	1,690,830	1,654,073
544	Transmission system	642,083	759,898	718,046	90	90	90	577,875	683,908	646,241
	Total	$50,759,843	$58,804,588	$55,997,692	75.3	88.7	85	$38,272,547	$52,181,743	$47,556,442
	Overheads									
501	Engineering and superintendence	3,299,975	2,940,229	2,799,884	100	100	100	3,299,975	2,940,229	2,799,884
546	Law expenditures	253,799	1,176,092*	559,977	100	100	100	253,799	1,176,092*	559,977
547	Interest during construction	4,587,296	7,393,097	5,072,717	100	100	100	4,587,296	7,393,097	5,072,717
549	Taxes	462,229	462,229	462,229	100	100	100	462,229	462,229	462,229
550	Miscellaneous	2,539,240	1,826,832†	3,589,186	100	100	100	2,539,240	1,826,832†	3,589,186
	Cost of financing	3,166,425	4,476,184	.....	100	100	.....	3,166,425	4,476,184	.....
	Total	$14,308,964	$18,274,663	$12,483,993	100	100	100	$14,308,964	$18,274,663	$12,483,993
	Total of physical property and overheads	$65,068,807	$77,079,251	$68,481,685	80.7	91.4	87.7	$52,581,511	$70,456,406	$60,040,435
	Working capital	1,400,000	2,000,000	1,500,000	100	100	100	1,400,000	2,000,000	1,500,000
	Total	$66,468,807	$79,079,251	$69,981,685	81.2	91.6	88	$53,981,511	$72,456,406	$61,540,435
	Going value	6,506,881	16,000,000	8,560,210	100	100	100	6,506,881	16,000,000	8,560,210
	Grand total	$72,975,688	$95,079,251	$78,541,895	82.9	93	89.2	$60,488,392	$88,456,406	$70,100,645

* Includes administrative and legal expense. † Includes organization prior to construction, $1,764,138; and insurance during construction, $62,694.

original cost of each of the 1,357 used and useful cars a multiplying factor based on the trend of costs given to the trade by the J. G. Brill Company for the period from 1914 to 1924, and on information secured by Robert M. Feustel, consulting engineer, from the Brill company on the trend of prices previous to that date; to the trended cost so secured he added 1 per cent for omissions and contingencies. The commission said that neither the people's counsel's nor the company's estimates include any allowance for several hundred cars of antiquated design still retained by the company, but not used and having no prospect of being used. The company did include the cost of 110 open car bodies which at the date of valuation were being rebuilt into permanently coupled units. The cost trend referred to did not include shop overhead costs of the cars. The company's estimate was based upon the figures furnished by the J. G. Brill Company as to the reproduction cost of these cars, including shop overheads and 15 per cent profit. The commission said that after careful consideration of all the testimony in regard to the value of the used and useful cars and excluding several hundred obsolete cars, it accepted the cost figures presented by the Brill company, with the exception that it reduced the profits from 15 to 10 per cent, which brought its reproduction cost to $11,486,901.

The railway company did not make any separate claim for legal expenses, but made a claim for administrative and legal expenses combined, amounting to $1,176,092, practically 2 per cent of items covering the total of physical property. The commission made an allowance of $559,977.

Under the item of Miscellaneous the commission said:

The company included insurance, organization prior to construction, and legal and administrative expenses. People's counsel included organization prior to construction, and administration during construction, but made no allowance for insurance. If it is considered that of the 2 per cent claimed by the company for legal and administrative expenses one-half of 1 per cent is for legal expenditures, the other 1½ per cent would be for administration during construction.

In the people's counsel's estimate there was included under Miscellaneous an item of 5 per cent, and for purposes of comparison we have divided this so that 2 per cent is for organization prior to construction and 3 per cent for administration during construction.

The following are the estimates of the various items: Organization prior to construction—people's counsel's estimate, $1,015,697; railway's estimate, $1,764,138. The company's figure is 3 per cent of the total physical property, while the people's counsel's figure is 2 per cent of the total physical property.

Administration during construction—people's counsel estimated $1,523,543, the company estimated $882,069. The people's counsel's estimate is based on 3 per cent of the total value of the physical property, while the company's claim is for 1½ per cent of the total value of the physical property. This difference is brought about by the fact that the company, in claiming a general contractor would be employed, figures that the cost of administration during construction would be less with a general contractor than if one were not employed.

Insurance—The company estimated $62.694. This is the actual insurance paid by the company during the year 1923. People's counsel made no allowance for insurance, as he claimed all necessary allowances were made in the base cost.

The total claims for both the company and the people's counsel for this miscellaneous item are as follows: People's counsel's estimate, $2,539,240; railway's estimate, $2,708,-901. The commission has included all the above items and in addition, as provided for in the classification of accounts, has included such expenses and cost of financing as would be incurred by the company as explained in the discussion of costs of financing, no separate allowance has been made elsewhere for this item. The commission arrived at a figure for the miscellaneous account of $3,589,186.

Under working capital, people's counsel claimed $1,400,000 and the company $2,000,000. Both included approximately $1,000,000 as the cost of necessary materials and supplies on hand. The commission allowed this $1,000,000 and approximately two weeks operating expenses amounting to $500,000, giving a total of $1,500,000.

The per cent condition of the completed property, as claimed by the railway, was 91.7. The people's counsel's claim was 81.3. The condition found by the commission was 88 per cent.

For going value the commission adopted the figure of 12½ per cent of the physical property and overheads, not including working capital, or $8,560,210.

The company claimed that the original cost of the property at the time of the consolidation in 1899 was at least $42,621,455. The cost of the net additions since that time have been $25,537,453. The company therefore claimed as of Jan. 1, 1924, that the original cost of the property was at least $68,158,908. People's counsel claimed that the original cost at the time of the consolidation was $32,000,000, and adding the $25,000,000 in additions, that the original cost of the property as of Jan. 1, 1924, was $57,000,000.

After summing up the various elements entering into the determination of a fair value of the property the commission found the fair value of the property, without easements, to be $70,000,000.

The opinion discussed the question of easements at some length. This was the only subject upon which all three members of the commission could not agree. The majority opinion valued these at $7,000,000, bringing the total valuation to $77,000,000.

During the course of the investigation and hearings three subjects which had nothing to do with the valuation came before the commission. These included the rerouting of the street cars, the removal of one-man cars from the Halethorpe line, both of which are being considered by the Baltimore Traffic Survey Commission, and the issuing of a weekly pass at a fixed rate. In regard to the weekly pass the commission stated that it feels it would be unwise to require the railway company to embark on such an experiment. Continuing, the commission said:

Proponents of the weekly pass idea testified that it was "a gamble," that there was no way of checking the results of the pass upon the revenues of those companies in other cities, but their general impression was that it had been helpful.

In view of the testimony submitted, this commission does not feel justified in requiring the company to issue such a pass or ticket, and it would hesitate to approve such a plan if it were proposed by the company, on the ground that it would be a marked departure from the plan of measured service, under which the patron of a utility pays for what he receives, and toward the plan of unlimited service for a fixed charge, or flat rate.

As the period for which the present rate of fare was ordered to remain in force expires with the determination of the present case, and as the rate of fare was not an issue in the valuation proceedings, the commission will, in its order, require the continuance of the present base rate fare of 7½ cents when tickets or fare checks are purchased, or 8 cents cash, until April 30, 1928, with the provision that if any proceedings involving the rate of fare be pending at the expiration of that period, then the present rate will be continued for an additional period of six months unless such proceedings shall be terminated before the expiration of that time.

Ralph Budd Discusses Railroad Electrification

Mountain Grades and Terminals Most Likely Sections for Development—Capital Can Be Obtained if Savings Justify Expenditure

SIGNIFICANT facts regarding steam railroad electrification which will be appreciated by everyone are given in an interview with Ralph Budd, president Great Northern Railway, published in *Electrical World* for May 8. Mr. Budd states his considered opinions on the future prospects for electrification, on the benefits to be derived therefrom and on the conditions that must be met. The questions and answers are presented verbatim:

Q. In what order will future railroad electrification occur most likely—in large terminals, along heavily traveled trunk lines, over mountain grades, etc? Where are the greatest possibilities geographically now?

A. On mountain grades where hydro-electric power is cheap; in terminals which can show large incidental advantages such as enhanced values of real estate; along heavily traveled trunk lines which are approaching the limit of their capacity on present trackage and where more right-of-way will be necessary; also in the eastern part of the country over mountain grades with heavy traffic, especially in coal, which gives uniform high load factor through the year.

Q. What facts must be obtained before such electrification is accepted by railroads?

A. There must be more data based on actual performance as to (a) cost of construction; (b) cost of operation; (c) savings due to electrical operation; (d) incidental advantages, such as enhanced values of real estate, increased efficiency outside of savings in operating cost of traction power.

Q. Are not the cost of electrifying and the difficulty of attracting the necessary capital the obstacles to electrification more than any doubt regarding relative performance of steam and electric equipment?

A. I do not think so. Necessary capital is obtained by railways in large amounts where the saving to be made by the investment justifies it. It is not a question of relative performance of steam and electric equipment, but a question of savings that may be made in operating expenses by reason of electrical installation. Unless traffic is heavy or some of the other conditions in answer to Questions 1 and 2 obtain, it might not be prudent to invest large sums for electrification even though the funds were readily available.

Q. What can the electrical industry do directly or indirectly (through educating the public possibly) to enable railroads to shoulder the financial burden of electrification?

A. The public may be educated to appreciate its interest in having the railroads earn a fair return on the value of their properties, so that they may be able to provide facilities for still better service. Open-mindedness on the part of the large electrical equipment companies as to the type of electrification best suited to each case, rather than always insisting upon a certain type of electrification, would tend to dispel the doubt created in the minds of railway men because of the conflict between the types as advocated by the manufacturers.

Q. In terminal electrification, is it not likely that the value of overbuilding rights made possible thereby will offset the cost of electrification?

A. This point was mentioned in Question No. 1. Circumstances in each case will govern. The New York Central electrification in New York is the outstanding example of the high value of overbuilding rights. In many terminals there would be no such appreciable added value.

Q. For trunk-line electrification what is the maximum limit that fixed and operating charges for electrification can attain per ton-mile traffic per year to warrant consideration by railroads? (Any other basis will suffice.)

A. Operating charges after electrification must be enough less than they were before electrification (or than they would be after other improved operating conditions that might be brought about) to pay interest on the excess cost of electrification and at least 5 per cent per annum additional as a factor of safety.

Q. Should railroads load themselves with the capital expenditure for generating plants, transmission lines and substations and further complicate their already complex problems by generating power, if power can be purchased at a reasonable figure?

A. The answer depends upon whether power can be generated by railroad-owned plants for less than it can be purchased from power companies. The power companies should be able to sell it more cheaply than railroads can make it, but if they are not willing to do so the railroads should not be restrained from making their own power. Such restraint might tend to higher prices, which in turn might discourage railway electrification.

Q. Based on past influences of transportation and electric power on the commercial and industrial growth of communities, is it not possible that trunk-line electrification would increase traffic because of the more reliable and cheaper electric power made available by transmission lines paralleling the railroads?

A. If transmission lines can be built along railroad right-of-way enough cheaper than elsewhere to justify making lower prices for electrical energy, undoubtedly industries would locate where the cheaper power is obtainable, but it does not seem reasonable or feasible to make a lower rate to industries supplied with power from transmission lines along railroad right-of-way than to other customers whose power is supplied by other transmission lines of a like character.

"Telling the World" with Slogans

CAR slogans, displayed in the manner shown in the accompanying illustration, are used by the Kentucky Traction & Terminal Company, Lexington, Ky., for the purpose of telling the public something about the local street railway situation. Slogans have been



One of the "Silent Boosters" Employed by Kentucky Company to Encourage Public Good Will

on the cars for several months and have created a great deal of favorable comment. Considerable pride is taken in the service and rolling stock of the railway by its executives and the publicity which comes through the use of these slogans simply reflects this spirit of enthusiasm. Here are a few of the slogans used:

Rapid, Comfortable Service.
This Car—a Community Asset.
Permanent 17-Hour Service.
America's Best-Equipped Railway Saves Time.
Shop by Street Car.
Our Pride, Your Comfort.
The Pullman of the Streets.
The Road of Originality.
No Parking Worries Here.
Exceptional Riding Comfort.
Ride Here and Save.
We Appreciate Your Patronage.

Small Models Visualize Car Appearance

Some Very Pleasing Effects in Car Construction Have Been Developed by the Grand Rapids Railway Through the Use of Wooden Models Made to Scale — Uniform Bands of the Same Color Carried Completely Around the Cars Give Improved Appearance

USE of small models to visualize the effect produced by various arrangements in car construction has been tried by the Grand Rapids Railway and the Department of Street Railways, Detroit, Mich. Both have obtained extremely gratifying results. It is difficult to obtain a correct idea of the combined end, side and roof effect that will result when cars are placed in service, if drawings alone are used to show the design. While the end or side may have a pleasing effect when considered by itself, a combination of the two is often inharmonious.

In Grand Rapids two wooden models were constructed. These were complete in all details, even to interior arrangement. The principal difference in the two models was in window arrangement, one having nine windows in the side of the car body while the other model had but five. As originally constructed the models had all the refinements that were considered essential in a car of most pleasing appearance.

Various changes and additions were made on the first models in order to study the effect. As a result several features have been incorporated that improve the appearance materially. Figs. 1 and 2 show two views of the nine-window model as at first arranged and Figs. 3 and 4 show corresponding views of the model with improvements. The effect that a few small changes had on the appearance is quite pronounced.

In the first arrangement it will be seen that the tops of the doors cut into the letterboard so as to prevent the same width band being carried across the tops of the doors and around the ends. This was overcome by changing the size of the upper door glass panels so as to give a wider frame at the top. The front end of the car was also changed to give the same width band at the top, and a visor was added over the center window. The windows for route signs were also changed and made the same on the two sides of the car. These changes made it possible to carry a letterboard band of the same width and color completely around the car.

The doors as first constructed also interrupted the streamline effect at the drip rail. To remedy this the size of the lower door panels was decreased and a wide band of the same color with black beading on either edge was carried entirely around the car in line with the drip rail. A similar lining up of the band forming the skirt at the sides was also effected. With the latest changes this band has the same width across the lower ends of the doors and around the ends. The width of the rear folding step is also the same as the skirt, the step thus fitting into the streamline effect.

Lining up the glass panels in the doors and at the ends of the car with side sash produces a very pleasing effect. Two headlights are also used. The design of these has been made to harmonize and improve the appearance of the car rather than to detract from it. The buffer arrangement at the front end has also been given much thought, and as a result a serviceable design has been evolved which is not only a protection to the car but also adds to its appearance.



Fig. 1—Three-Quarter View of Model Car as Originally Constructed

The doors break up the continuity of lines along the sides and across the ends of the car and produce an effect that the platforms are an addition to the car rather than a part of it.

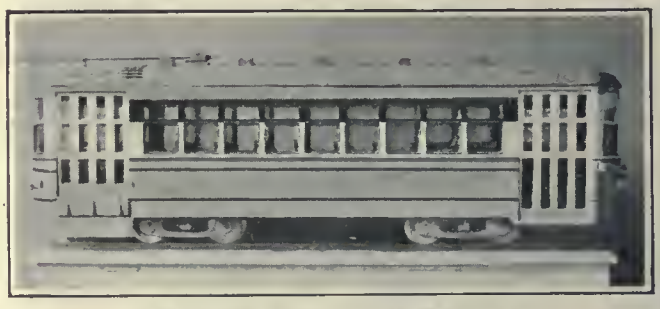


Fig. 2—Side View of First Model Car

The painting effect cannot be judged accurately from the illustration, but a patchwork effect appears to be produced by failure to carry the colors in bands entirely around the car.

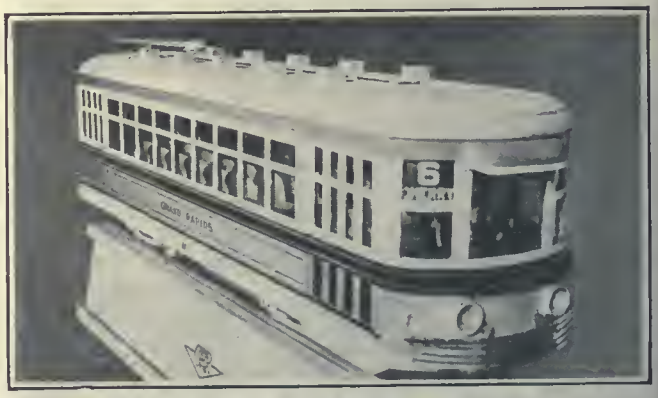


Fig. 3—Three-Quarter View of Model as Changed

Outstanding features of the ends and doors have been brought into alignment with the side arrangement to improve the appearance.

The effect produced by using wide windows, as shown in the second model illustrated in Figs. 7 and 8, is quite surprising. It was expected that the use of five wide

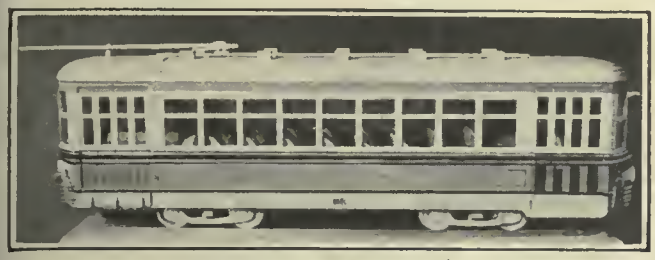


Fig. 4—Side View with Latest Changes
By carrying the same colors in the same width bands across the doors, a longer effect to the car body is produced.



Fig. 5—Late Type Model Showing Side Without Doors
This illustrates some of the particular advantages from single-end cars. In addition to freedom from doors, the windows at the end give a long, rakish appearance.



Fig. 6—End View of Model with All Changes Made
The illuminated dasher with two headlights and the new type of bumper are outstanding features. The arrangement of the side windows so as to provide a large route number and sign should be of particular convenience to the traveling public. The visor is another addition never before tried in car construction.



Fig. 7—Door Side of Model Car with Large Windows
While large windows may be an added convenience for passengers inside the car, they detracted from long flowing lines which are now being sought in car construction.



Fig. 8—Large Window Model Showing Side of Car Without Doors
Comparison of this with the narrow window car shows that the wide windows produce a dumpy effect which is not desirable.

windows instead of nine narrower windows in the car body would give a longer appearance to the car. Instead of that, the effect produced is just the reverse. The wide window car has a short, stubby appearance and does not present the long, rakish effect that car designers are now working to realize and which has the greater appeal to the traveling public.

The time and effort spent in making these small-scale models has certainly produced pleasing results. All realize the necessity of improving car appearance in order to obtain the maximum merchandising value from the purchase and use of new equipment. Other railways can profitably take up the use of such models to help determine the car best suited to their requirements and as an aid to producing cars of still greater attractive appearance.

Accidents Decrease and Service Increases in Buffalo

IMPROVED service and greater safety in operation are reported by the International Railway, Buffalo, in the operation of its local lines in 1925, and will be continued throughout this year. B. J. Yungbluth, president of the traction company, explains that during 1925 the number of accidents decreased 7.2 per cent. Serious accidents fell off even more, as shown by the fact that 10.28 per cent fewer persons were injured. For every 100 passengers carried in 1925 the company supplied 3.2 per cent more seats than in 1924, and the percentage was even greater in the three morning and two evening rush periods, when more than 50 per cent of the car riders travel. The percentage of cars on time increased from 75.2 per cent in 1924 to 90.17 per cent during last year.

With reference to crowded city streets, he said this condition was brought about by free parking of empty automobiles, which might cause delay in traction service. He said this condition was beyond the company's control, but the number of delays due to car failures last year showed a steady decrease. In December 36 per cent fewer cars were taken out of service for repairs than a year ago and a smaller force kept more cars in operation.

About 500,000 tokens were required to pay last year's charge for cleaning trolley streets of snow. The company not only maintains its own army of snowfighters but also pays one-third the city's bill for cleaning trolley streets. The company built six new snowsweepers last year, thus bringing the total fleet of snowfighters up to 23 sweepers, 30 plows, three motor plows, thirteen automobiles and three trucks, with an extra force of 350 men.

The Readers' Forum

Electric Railway Industry Challenges Loree Statement

So much interest has been aroused in the statement of L. F. Loree, president of the Delaware & Hudson Company, published in this paper for April 24, page 732, that the following correspondence between A. L. Shapleigh, president of the United Railways of St. Louis, and Mr. Loree is of particular interest. Additional comments by Messrs. Richardson, Buffe and Beeler indicate the reactions of leading electric railway men to Mr. Loree's statement.—EDITOR.

UNITED RAILWAYS OF ST. LOUIS
ST. LOUIS, MO., April 12, 1926.

Mr. L. F. LOREE,
Care of Dr. Daniel Upthegrove,
President Cotton Belt Railroad,
St. Louis, Mo.

Because of the esteem in which you are held and the high position which you occupy, any statements which you make pertaining to transportation matters are given large publicity and carry great weight.

It has been said that you consider St. Louis and Kansas City to be your home cities and therefore I venture to write you in regard to a statement you made April 9 last before the St. Louis Chamber of Commerce, which, though I am sure you did not so intend, may have an unfortunate effect here on our city transportation.

The statement that I refer to was "That six thousand millions invested in street and interurban railways might as well be charged off the books. The automobile has put them in the discard as the steam railroads put the stagecoach in the discard."

Though I have no large financial interest in the street railroads of St. Louis, I serve as president of the St. Louis system and, in company with others, I am striving to give St. Louis the best city-wide transportation possible. I believe we all appreciate the magnitude and aim of your work and realize that if they are to win their fight, the steam roads must have help, as you say, "in every way possible." I believe St. Louis will give you this help. But we, too, have our problem, which is the problem of city transportation, and we believe we have arrived at the correct solution which we are striving to put into effect. That solution is, a co-ordinated system of street cars and buses operated on a service-at-cost basis, similar to the Cleveland plan. Like Cleveland, our city has no subway and, due to the topography of St. Louis, will probably have no such system of great extent for some years. Mass transportation here depends upon surface cars to be practical because of our already congested streets by automobiles and buses. Today the street railroads here carry more than 1,000,000 persons per day—estimated to be more than 90 per cent of the people carried by street cars and buses. Our investigation shows clearly that, for mass transportation in St. Louis, neither the automobile nor the bus can take the place of the street car. Personally I believe that while the automobile and motor bus have superseded some interurban electric railroads, they have not superseded and cannot supersede the street railroads in cities. I believe the problems of the steam roads are more serious in this respect than are those of the city street railroads.

As a former director of the Frisco Lines, and at present a director of the P. C. C. & St. L. Railroad, I am somewhat familiar with the situation.

The steam roads must be preserved, protected and aided. So, too, the street railroads in St. Louis must be protected. Our citizens and bankers must invest more millions of dollars to give St. Louis the best service, and if they must do this, they must have reasonable protection for the return of their money.

In conclusion, I ask you to do us the courtesy to aid us rather than hinder us in our work. The city of St. Louis is about to promulgate and bring to the polls for vote by the people a service-at-cost franchise which will insure that car riders get their service at its cost. Investors and the citizens of St. Louis will be asked to put their money into additions and betterments that are necessary to give St. Louis the kind of service it deserves.

Your statement has already created a feeling of deep concern. I request that you give this matter thought. I understand that you spoke in generalities and had no special reference to the situation here, but your statement was not so taken.

I suggest that a letter from you to the Chamber of Commerce clarifying your position as to St. Louis would not only be appreciated by me but by all those who are genuinely interested in solving the city transportation problems for the mass population.

Yours very truly,
A. L. SHAPLEIGH,
President.

SAN FRANCISCO, CAL., April 19, 1926.

Mr. A. L. SHAPLEIGH,
President United Railways,
St. Louis, Mo.

DEAR SIR: Your letter of the 12th inst. has been forwarded to me here.

It would seem quite clear that, save in exceptional cases, the interurban and small town traction lines will find great difficulty in maintaining themselves as against the automotive vehicles.

On the other hand, it seems equally clear that in the larger cities the street spaces will not permit of the movement of the traffic by this means, nor has any other method yet been suggested that will take the place of the street cars.

When this comes to be generally recognized we may expect relief from many unreasonable burdens, such as street paving, as well as an adjustment of fares to meet increased wages and advances in the cost of materials and supplies.

Never has building activity been greater than now, and with growing suburbs grows the demand for extension of service. When it is found that this cannot be furnished, since capital cannot be further persuaded to embark in these enterprises, then we may look for recognition of the inescapable economic requirements.

I would greatly regret if anything I am reported to have said should be a source of embarrassment to your company. You are quite free to make such use of this letter as you may feel will benefit the United Railways. I wish that company and you every success in your difficult endeavors. Yours very truly,

L. F. LOREE.

CHICAGO SURFACE LINES

CHICAGO, ILL., April 29, 1926.

To the Editor:

The leading editorial in your issue of April 24 headed "The $6,000,000,000 Won't Be Wiped off the Books" is in line with the best thought in the electric railway industry and I desire to compliment you upon the forceful presentation of facts.

Electric railways have long since emerged from the doldrums of the war period. Without the governmental assistance required by the steam railroads and without, in most cases, even a sympathetic attitude on the part of public officials, they have worked out their own salvation.

It is astonishing, therefore, that anyone at this time should make such misleading statements as those credited to Mr. Loree.

The industry is on a sound economic basis. Last year was the greatest year of electric railway history. More passengers are being carried, management is more alert and service is more responsive to public needs than ever before.

To men of vision the future is bright. There is prosperity and usefulness ahead for those willing to adjust themselves to changing conditions.

G. A. RICHARDSON,
Vice-President

KANSAS CITY RAILWAYS

KANSAS CITY, MO., May 1, 1926.

To the Editor:

Permit me to express my appreciation of the editorial in the April 24 issue of the JOURNAL on Mr. Loree's reported statement that the $6,000,000,000 invested in electric railway facilities be charged off as a loss. It is forceful and constructive and reflects the mature, carefully considered judgment of those charged with the responsibility of financing and operating these public service utilities.

Mr. Loree undoubtedly, if given an opportunity to enlarge upon what was evidently a statement *obiter dicta*, would so qualify it and apply it as to give it an entirely different meaning. There are today unquestionably railway enterprises that should probably never have been built, those that changed conditions have rendered obsolete. But by the same token there are steam carriers in the same category. It is as wrong to judge the whole by these sick parts on the one hand as it is on the other.

The very vital necessity of the street railway is the only thing that kept it alive during the period from 1915 to 1920. The industry simply had to carry on because its collapse would have meant disintegration of business values and paralysis of urban life.

There is no especial fetich in motive power or roadway. If the thousands of men who are living daily with the problem thought that their interests and the interests of those they serve could be better served by a change in motive power or a switch from steel to rubber they would recognize the fact. Such a change would not keep them from being in the transportation business. The proof of this is the fact that 300 electric railway companies are using the bus as a tool of their trade, adapting it and co-ordinating it in comprehensive mass transportation plans. But they are continuing to look on the railway as the backbone of the entire service and are spending millions of dollars for new electric equipment and facilities. Surely these men, operators, executives, bankers, are not all wrong. I do not believe the record of the past few years in Brooklyn, in Pittsburgh, in Chicago on the North Shore, and in many other places, would support the statement that the electric railway is through as a proper method of handling mass transportation at the minimum cost.

F. G. BUFFE,
General Manager.

THE BEELER ORGANIZATION

NEW YORK, April 30, 1926.

To the Editor:

Your leading editorial in the JOURNAL of April 24, under the caption "The $6,000,000,000 Won't Be Wiped Off the Books," is timely and has a real message that should be heeded. A large share of the trouble with the traction industry today is that many of the men interested in it are not sold themselves. They have a feeling that something is going to happen, and they hesitate. There is no doubt that something will happen if they hesitate too long. The scriptural quotation "What I feared came upon me" is applicable here.

I have a number of friends who are steam railway men and their attitude generally toward the traction industry is and has always been one of good-natured contempt. They feel sorry for any management that has to subsist by collecting nickels and pennies. All steam railway men may not feel this way, but most of those whom I know do. The fact that traction lines haul ten times as many passengers annually as all the steam railroads is apparently lost sight of.

The universal abolition of traction lines in the near future is no more probable today than the wiping out of all steam railroad passenger traffic business on account of great increase in the use of the automotive vehicle and other competitive methods of travel. The managements, however, that lag behind and do not keep their service up to date will suffer, whether operating traction lines or steam railroads.

JOHN A. BEELER.

P., L. & M. Electric Locomotive Tested

DURING the latter part of 1925 the Oerlikon trial locomotive, type 2BB2, built for the Paris, Lyons & Mediterranean Railway, was subjected to exhaustive tests both as regards running and regenerative braking. This locomotive has an output of 2,400 hp. at 31 m.p.h. and a maximum speed of 68 m.p.h. The trials were entirely successful and the locomotive has now commenced its period of guarantee. The running tests covered the whole range of operation of the locomotive up to the highest speed and maximum load. The trials with regenerative braking were carried out under varied speed conditions and the stipulations of contract satisfied. The latter laid down that the electric braking equipment was to be capable of dealing with a total train load of 300 tons, including a weight of locomotive of 120 tons, on a gradient of 1 in 33, the speed being maintained at 22 to 25 m.p.h. During these tests a current of 600 amp. at 1,500 volts was fed back into the system with the train traveling at 25 m.p.h.

The method of regenerative braking evolved by the Oerlikon Company for these direct-current locomotives is very simple. The same controller handle which serves for starting up and running is also used for braking; the driver has only to know what grouping of motors is required for the speed at the time.

Maintenance Notes

Air-Operated Chuck Used with Drill Press

CLAMPING and holding material firmly during drilling often consumes nearly as much time as the drilling operation itself. Many railway shops have equipped their drill presses with hand vises, so that the material may be clamped securely in position without loss of time. An improvement on this method is an air-operated chuck constructed in the shops of the Department of Street Railways, Detroit, Mich., which has been applied to one of the drill presses most used. This has proved an additional time and labor saver over other methods in that work of almost any shape can be clamped quickly and firmly. An accompanying illustration shows the construction.

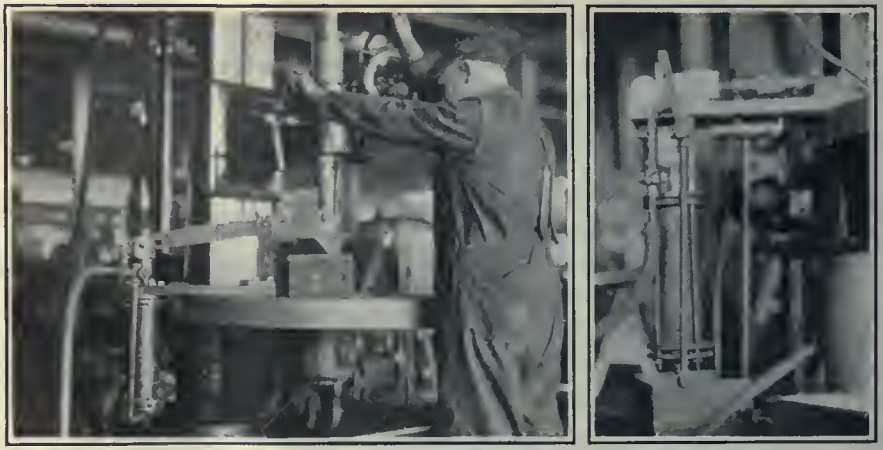
The mechanism consists of an air cylinder about 4 in. diameter by 15 in. long. The plunger of this cylinder is connected directly to a wedge, which when pushed upward acts through rollers on a horizontal arm to close the jaws of the chuck. In order to provide for different sizes of material, the connecting arm is provided with a screw adjustment in the center, and by lengthening or shortening the rod the opening of the jaws is increased or decreased.

In order to provide a firm clamping for irregular material, the stationary side of the jaw is pivoted at the center, and by providing clearance at the ends this will swivel slightly and so will conform to the shape of the piece which is to be clamped. In ordinary operations air from the shop system is used, which is from 80 to 90 lb. pressure. The connection from the shop line to the cylinder is through a flexible hose and piping with three-way valve. In one position air is admitted to the bottom of the cylinder, so as to force the plunger upward and in the reverse position air is exhausted so as to remove the pressure.

Another air-operated clamping device constructed somewhat along the lines just described is used to hold material to the bed of a drill press during drilling. This mechanism



Air-Operated Chuck and Liquid Circulating System as Applied to a Drill Press in the Shops of the Department of Street Railways, Detroit



At Left, Air-Operated Clamp as Used to Hold Material to the Bed of the Drill Press. At Right, Close-Up of Air Cylinder Used to Operate Clamping Devices

consists of a lever arrangement on one end of which is a small air cylinder, which is attached to the compressed air supply in the shop. The fulcrum of the lever is adjustable to three different positions on the vertical support. The pins of the fulcrum point are also adjustable on the main lever in several positions. The entire apparatus is fastened to the bed of the drill press and can be used in one position on many different kinds of jobs. The fulcrum pin is easily removable and can be changed quite easily.

This arrangement holds the work tightly and avoids the possibility of accidents often caused when mechanics attempt to hold the material by hand, not bothering to use the mechanical clamps and bolts that would otherwise be required.

Another improvement which has been applied to all drill presses and lathes in the Detroit shop is a liquid circulating system for providing a supply of liquid at the cutting tool and material. The circulating system as applied to a drill press is shown in one of the illustrations.

A circulating pump is used to draw the liquid from a reservoir and force it through a flexible tube to the cutting tools. This pump is driven directly from the horizontal shaft of the pulley by adding the necessary pulleys and belt connection. A sheet iron tank 12 in. x 12 in. x 12 in. is provided on the floor to hold the liquid. After discharge at the tool through the flexible tube, the liquid follows grooves and openings in the drill press table and runs by gravity into a pan underneath which is 12 in. x 12 in. x 3 in. deep. From this catch pan the liquid flows by gravity into the supply tank and is then circulated again through the tube to the cutting tool.

This type of circulating system has been applied to all lathes and drill presses and has produced an enormous saving through the ability to speed up machinery so as to take larger and faster cuts.

Motorman's Seat Adjustable as to Height

IN ORDER to provide its motormen's seats so that they can be adjusted as to height in a manner similar to that of old type piano stools, the Erie Railways, Erie, Pa., has threaded the ⅞-in. swiveling rod which forms the pivot for the seat. A square thread is cut on it, three to the inch. The horizontal swiveling



Type of Motorman's Seat Arranged to Provide for Various Adjustments

rest is cut out fork shaped and a hexagonal nut is placed inside the opening. These hexagonal nuts are welded to the fork.

The swiveling arm at the rear of the seat allows for a back and forth adjustment to accommodate various motormen. A spring attachment keeps this in one position except when it is necessary to move to a new adjustment.

Cutting Worn-Out Tires from Wheels

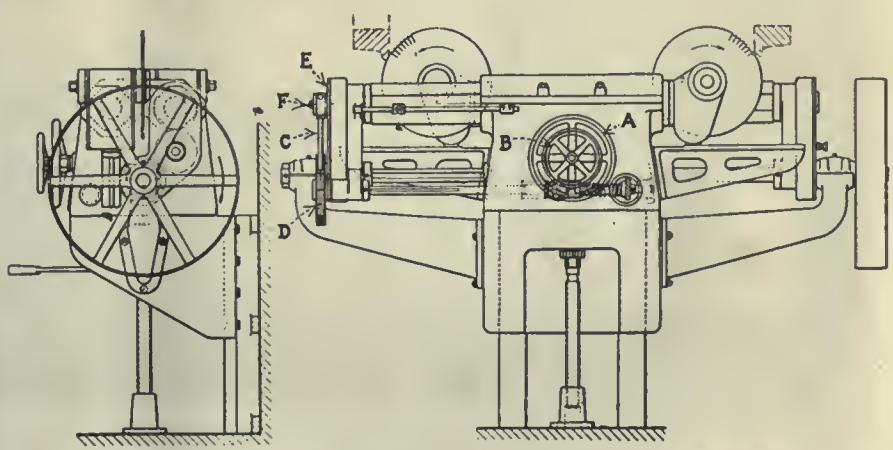
WORN-OUT tires may be removed from the wheels of electric cars or locomotives by a very effective and simple method described in the March 26 issue of *Verkehrstechnik*. The method consists of sawing the tire open at one point. The cut is not carried entirely through the tire, but approximately ½ in. of material is left at the bottom. This removes any danger of damaging the spider of the wheel. After the saw cut is made a wedge hammered into the cut completes the break and causes the tire to spring off.

A special machine has been developed for making these saw cuts and the work can be carried out on either one or both wheels of a pair at the same time. The machine is designed for pit installation, so that it can be installed in an average electric car shop. It can be driven directly by an individual motor or can be belted to an adjacent transmission shaft if one is available when installed in carhouse pits; however, individual drive is preferable.

To anchor a set of wheels during the cutting operations, grab hooks or tongs are used. Where wheels have openings these clamps may be placed through the wheels, and with solid wheels they are arranged to be applied to the axle. The machine used for cutting has a crosshead which carries the two saws. They are raised against the flanges of the wheels by means of a ratchet mechanism. When in proper position the mechanical feed is set, which automatically takes care of further advancing.

A spring-operated friction clutch is provided between the feeding ratchet wheel and its driving shaft. This stops further movement of the saws automatically if a hard spot in the tire is encountered, and feeding is not resumed until the saw overcomes the increased resistance. Double worm reduction is provided between the driving pulley and the saws.

Saws or milling cutters of 14 in. to 18 in. diameter can be used with the machine, and a small circulating pump is provided to deliver soapy water or other cutting fluid upon the saws. The circulating system also provides for return of the fluid to the collecting sump by gravity and it can then be recirculated through piping and flexible tubing to the cutting tools.



This Saw for Removal of Tires Is Arranged for Pit Installation

New Equipment Available

Floodlight for Electric Railway Yards

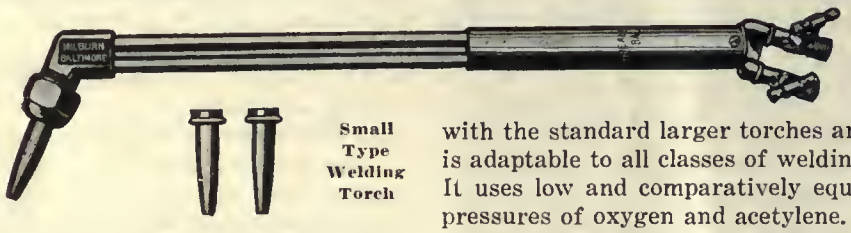
USE of a chromium plated reflecting surface, light weight and airtight construction are the outstanding characteristics of the new cast aluminum floodlight being manufactured by the Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa. This light is said to be particularly well adapted for use in railway yards and industrial plants.

The chromium plated surface of the reflector is an important achievement in lighting equipment as it lengthens the life of the reflector and eliminates the necessity for delicate care essential with other types of surface. High reflecting properties are possessed by the chromium plated surface and at the same time it is of a tool steel hardness. The manufacturers claim that it will neither tarnish nor break and is not subject to water vapor fumes. With this reflector it is possible to wipe off dust with a gritty waste without damage to the surface.

Considerable reduction in weight has been obtained without losing the qualities of sturdy construction. The weatherproof features of the floodlight are obtained by sealing the lamp and reflector chamber and in this way initial efficiency is maintained over long periods of time without large upkeep costs.

Light-Weight Gas Welding Torch

DEMANDS for a small welding torch for work not requiring the usual standard torch have led the Alexander Milburn Company, Baltimore, Md., to perfect the type J-Jr. torch. This is a sturdy, compact design giving a high degree of efficiency and economy. The torch uses the same tips as are supplied with the standard larger torches and is adaptable to all classes of welding. It uses low and comparatively equal pressures of oxygen and acetylene.



Small Type Welding Torch

Due to its light weight, it does not tire the workman to operate it continuously. The supermixing of the gases through a standardized system of multiple mixing assures a complete intermixing of the gases and a uniform flame. The seats of the tips are flat, with annular grooves coinciding with those in the head, the gas passages entering through the annular grooves or rings which separate the gases. The construction of these seating surfaces allow lateral expansion of torch head and tip without distortion and the seats are very easily refaced.

The J-Jr. torch is adapted to gas supplied either from generators or compressed in tanks. It is made of bronze forgings and specially drawn stainless tubing. An angle of 67½ deg. in the head allows a natural position in operating the torch, utilizes the heat to best advantage and protects the operator's hands. The torch is 18 in. long, weighs 25 oz. and has three welding tips.

Elevating Platform Truck for Shop Use

DESIGNED to carry unusually heavy loads, a new elevating platform truck has been placed on the market by the Yale & Towne Manufacturing Company, Stamford, Conn. The truck is of a low-lift type, with features desirable for self-loading. It has a short turning radius. The machine itself being narrow, it is easy to drive in narrow aisles such as are encountered in electric railway shops. Hardened steel steering pivots with bronze bushings and the high-pressure lubrication system reduce friction and make steering easy when carrying full load.

The triple spur-gear elevating mechanism consists of the same unit as that used in the company's K-22 truck. The elevating platform is raised by two large eccentrics, mounted on the hoist unit shaft.



New Type of Low-Lift Truck for Shop Use

Association News & Discussions

Using the Bus to Relieve Congestion*

Efficiency of Passenger Transportation in City Streets Can Be Increased by the Use of Common-Carrier Vehicles in Place of Private Automobiles and Taxicabs

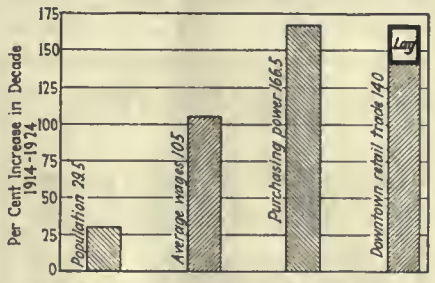
By JOHN A. MILLER, JR.
Associate Editor ELECTRIC RAILWAY JOURNAL

MANY plans for the relief of traffic congestion are based on the general theory of providing more roadway area, to be used in exactly the same way that the existing street area is now used. Cutting through new thoroughfares, widening present roadways, arcading sidewalks, double-decking arterial routes and placing the electric railways underground are among the proposals made. Enormous expense would attend the execution of any of these plans, and it is extremely doubtful if permanent relief from traffic congestion would be attained. Experience has shown in a number of instances that new streets cut through to relieve overcrowding on older streets soon become congested themselves, without any marked diminution of traffic on the other streets. On the other hand, by the more intensive use of present streets a far larger volume of traffic could be moved through them without the necessity for huge expenditures on improvements.

The present general practice of using roadway space for the storage of private automobiles is in reality neither a convenience to the automobilist nor a benefit to the merchant. Elimination of parking in congested districts would greatly increase the roadway available for moving vehicles. Use of attractive common-carrier vehicles can be developed to handle a large part of the traffic now using single-passenger or two-passenger vehicles. A material reduction in congestion can thereby be effected without excessive cost. Movement of all traffic will be facilitated to a degree that will be advantageous to the users of public and private conveyances.

Contrary to a prevalent opinion, prohibition of parking in the congested districts is likely to aid business rather than injure it. After the enactment of no-parking ordinances in Pittsburgh retail trade in the downtown district showed an increase in comparision with that of the outlying commercial centers. In a large number of cases analysis would undoubtedly show that the volume of trade in downtown stores has not kept pace in recent years with the development of a community. As an example, let us consider the situation in a certain city of about 500,000 people, with some 250,000 more in the adjacent suburban territory. In 1924 the population of this entire district was very nearly 130 per cent of the 1914 figure. At the more recent date the average individual received wages which were approximately 205 per cent of those received in 1914. From these data we see that the total purchasing power of the district in 1924 was 266½ per cent of that existing before the war.

Investigation of the volume of business of a number of representative downtown retail stores in this particular city showed that in 1924 it was only some 240 per cent of that done ten years earlier. Thus it will be seen that the growth of retail trade in the downtown section lagged far behind the increase in the purchasing power. On the other hand, in the case of one particularly high-grade store, some 3 miles from the business center, the present volume of business is approximately 480 per cent of that done in 1914.



The Volume of Downtown Retail Trade Lags Behind Purchasing Power

A realization of the remarkable increase which has occurred in the outlying commercial centers during the decade may be had from a study of the locations of banks of deposit. In 1924 the number of such banks in the entire area was 49, compared with 37 in 1914. During these ten years, however, only one new bank was opened in the center of the city. All others were in the outlying districts. The zone from 1 to 2 miles from the center showed an increase of four, as did also the zone from 3 to 4 miles.

Figures of this kind do not show with mathematical accuracy the comparative growth of business in the city center and surburban areas. Nevertheless, a bank of deposit is rarely opened in a purely residential section, and its presence may fairly be taken to indicate the existence of a business community. The surprising increase which has occurred in the outlying sections illustrates clearly how business has sprung up there during the past ten years.

Downtown traffic congestion undoubtedly is the most important reason for this process of decentralization. Transportation in public conveyances has become relatively slow and subject to irritating delays. It is a task of considerable difficulty and some danger to drive a private automobile in the downtown streets. As a result, people do their buying near at home. This tendency will increase as congestion increases. Retail merchants, therefore, should favor rather than oppose the elimination of parking on important streets.

If parking of private automobiles in the public streets downtown is forbidden, a question arises as to what can be done with them. One answer might be to provide parking spaces in the centers of the blocks, which are usually not built upon, underneath some of the existing buildings, or in many storied garages. The number of automobiles which could be accommodated in this way is more or less limited, however, and the charges are likely to be rather high.

Establishment of parking spaces on the outskirts of the city and transportation of passengers downtown by public conveyance is a solution that is being tried in a number of cities. Several such parking spaces are operated by the Philadelphia Rapid Transit Company, which carries the automobilists from the outlying sections into the business district by rail. A number of other electric railway companies have undertaken similar schemes. In these cases the charge for parking includes transportation back and forth by street car. An arrangement of this kind not only solves the problem of where to store the private automobiles without wasting valuable roadway area, but it also promotes the efficiency of passenger transportation in the congested district by substituting one large vehicle for many small ones.

ECONOMIZING ROADWAY SPACE BY USE OF LARGE CAPACITY VEHICLES

Substitution of public transportation vehicles of fairly large carrying capacity for individual automobiles carrying on the average not more than two persons can be advantageously made in many instances. For example, de luxe bus service often will prove an entirely acceptable substitute for the use of numerous private automobiles. In Washington, D. C., the Capital Traction Company operates luxurious buses from the high-class Chevy Chase residential district to the shopping district of the city. Fares are higher than on the street cars because of the superior facilities provided. The net transportation expense to the Chevy Chase resident by bus, however, is smaller than when he uses his own automobile, and with existing conditions of congestion the greater convenience of the bus service is marked. This service has proved very popular.

Similar transportation facilities are

*Abstract of a paper published in the proceedings of the American Society of Civil Engineers for May, 1926, page 827, to be presented at a meeting at New York, June 2.

AVERAGE LOADING OF PRIVATE AUTOMOBILES AS SHOWN BY RECENT TRANSPORTATION SURVEYS

City	Duration		Vehicles	Passengers	Passenger per Vehicle
Washington, D. C...	April 30 (in)	15 hr.	100,284	171,051	1.71
	April 30 (out)	15 hr.	92,666	154,394	0.67
	June 4 (in)	15 hr.	114,047	223,000	1.96
	June 4 (out)	15 hr.	112,957	218,988	1.94
Chicago, Ill.....	June 4	1 hr.	2,600	4,700	1.81
Atlanta, Ga.....	June 4	All day	27,540	49,600	1.8
Los Angeles, Cal....	June 4	11 hr.	261,974	393,322	0.50
Detroit, Mich.....	June 4	1 hr.	12,180	21,200	1.74

provided between the Edgewater Beach Hotel and the shopping district of Chicago. Although intended primarily for the guests of the hotel, patronage of this de luxe bus service is not confined to them, but includes residents of the entire fashionable neighborhood in that vicinity. Not only are the buses a cheaper and more convenient mode of transportation than private automobiles or taxicabs would be under these circumstances, but they have come to be considered a more distinguished mode. In other words, it gives one greater prestige to be seen alighting downtown from the 35-cent Edgewater Beach bus than from a taxicab at twice that fare.

More general use of collective transportation vehicles of this kind would go far toward increasing the efficiency with which the available street space is used. Traffic counts made in various cities show that private automobiles carry an average of less than two passengers per vehicle, as shown in the acompanying table. This is equivalent to about 30 sq.ft. or more of street area per passenger. A bus of ordinary size can accommodate comfortably at least twenty persons. Assuming that it would average only three-quarters of a full load, fifteen people would be carried. Under these circumstances about 16 sq.ft. of street area would be required per passenger. Inasmuch as the speed of the bus and the private automobile would be approximately the same in the congested district, the use of the former to replace the latter would double the efficiency with which the existing street area is utilized.

Theoretically an even greater increase in efficiency might be attained by the substitution of the electric rail car, requiring only 3.5 sq.ft. of street space per passenger carried, for the private automobile. In actual practice, however, it is found that the character of the service rendered by these two modes of transportation is so different that it is impracticable to try to replace the automobile by the trolley. Well-operated bus service with commodious vehicles, on the other hand, can be made an entirely acceptable substitute for the use of private automobiles.

Most wasteful of all vehicles used in passenger transportation is the taxicab. Investigations made by the writer at various locations in New York City indicate that the average load is only 0.83 passenger. As this vehicle occupies some 64 sq.ft. of street area, the space required per passenger carried is about 80 sq.ft. When it is realized that there are more than 17,000 taxicabs in New York City, and correspondingly large numbers in other cities, the importance of this cause of congestion is evident.

Surprisingly enough, the greater part of the taxicab movements follow definite routes. In the transportation survey of Washington, D. C., by McClellan & Junkersfeld movements of 324 taxicabs operated by four taxicab companies were analyzed for one weekday. During this typical day 7,924 taxicab movements were studied. Of this number some 5,000 movements were made along only 33 main routes. The three heaviest routes were between the Union Station and the business district, 600 trips; between the Mount Pleasant residential district and the business district, 400 trips, and between Georgetown and the business district, 350 trips.

From these figures we see that in Washington about five-eighths of the taxicab movements are along certain definite routes. Substantially the same condition no doubt prevails in other cities. Why not replace these taxicab movements along definite routes by bus service requiring 16 ft. of street area per passenger carried instead of 80?

Obviously it would not be feasible to try to replace entirely the taxicab by the bus, any more than it would be to try to replace altogether the private automobile. It is clear, however, that so much of both of these kinds of traffic flow along a comparatively few main routes that a real opportunity exists to effect an important improvement in passenger transportation in congested districts by thus using one vehicle of high-carrying efficiency to perform the work now being done by numerous smaller vehicles of low-carrying efficiency.

COMING MEETINGS OF *Electric Railway and Allied Associations*

May 11-13 — Chamber of Commerce of the United States, annual meeting, Washington, D. C.

May 13—Central Electric Railway Master Mechanics' Association, Orlando Hotel, Decatur, Ill.

June 2-4—Canadian Electric Railway Association, annual convention, Quebec, Canada.

June 9-16—American Railway Association, Mechanical Division, annual convention, Atlantic City, N. J. Car matters, June 9-11; locomotive matters, June 14-16.

June 21-25—American Society for Testing Materials, annual meeting, Haddon Hall, Atlantic City, N. J.

June 25-26 — New York Electric Railway Association, annual meeting, Hotel Champlain, Bluff Point, N. Y.

June 28-July 2 — Central Electric Railway Association, summer meeting, S. S. South American, Buffalo, N. Y., to Chicago, Ill.

July 8-10—Midwest Electric Railway Association, annual convention, Brown Palace Hotel, Denver, Colo.

August 12-13 — Wisconsin Public Utility Association, Railway Section, La Crosse, Wisconsin.

Oct. 4-8—American Electric Railway Association, annual convention and exhibits, Public Auditorium, Cleveland, Ohio.

Birney Club Hears About Bus Brakes

AN ILLUSTRATED talk on the subject of brakes for buses and motor trucks was delivered at the April meeting of the Birney Club held at the Missouri Athletic Association, St. Louis. The attendance totaled 57, of whom 33 were members and 24 were guests. H. D. Hukill, chief of the automotive division Westinghouse Air Brake Company, was the speaker of the evening.

Greater safety of operation is possible with the air brake, he said, for four reasons: First, there is sufficient flexibility to permit the precise regulation of braking force demanded by the varying conditions of grade, load and road surface; second, the same force is automatically applied to each wheel and equal retardation developed on both sides of the bus, thereby minimizing the danger of skidding; third, it relieves the driver of all fatigue incident to braking, and fourth, it permits the use of metal brakelining, which produces the same effect under all conditions.

The special safety feature designed by Mr. Birney for use on buses may be attached to any standard chassis without in any way disturbing the operation of the original manual braking equipment, he said. One of the early installations of Westinghouse air brakes with metal shoes to bus fleets was that of the Key System Transit Company, where it was found that the total cost of brake maintenance was only 50 cents per 1,000 miles as compared with $3.50 per 1,000 miles for manually-operated fabric brakes in the same service.

U. S. Chamber of Commerce to Discuss City Traffic Problem

CITY traffic will be one of the important subjects discussed at the fourteenth annual meeting of the Chamber of Commerce of the United States to be held in Washington, D. C., May 11 to 13.

A. L. Humphrey, president Westinghouse Air Brake Company, will preside. Elliot H. Goodwin, resident vice-president of the National Chamber, will set forth the main points in the program recently advanced by the Conference on Street and Highway Safety for dealing with the traffic problem.

George M. Graham, vice-president Chandler Motor Car Company, will discuss congestion and accident hazards from the standpoint of the automobile industry, paying particular attention to the problem in the cities.

Frank R. Coates, president American Electric Railway Association, will talk on "Co-ordination of Transportation as a Factor in the Solution of the Traffic Problem."

The relation of the steam railways to the city traffic problem will be dealt with by R. H. Aishton, president American Railway Association.

The News of the Industry

Complications Continue in Columbia

Before many weeks have passed it is more than probable that the clang of the trolley gong, so long a familiar sound in Columbia, the capital of South Carolina, will be replaced by the bark of the bus, for the South Carolina State Highway Commission has given a permit to the Carolina Transit Company to operate buses on streets which they have heretofore not touched.

Months ago, when citizens petitioned that the Columbia Railway, Gas & Electric Company, which operates the railway, be allowed to take up a short stretch of track, it was made known that the railway was losing money—from $6,000 to $8,000 monthly—and that it was only a question of time when operation would cease. The Carolina Transit Company was then organized and some time later was authorized to operate buses in sections not served by the street cars. Jitneys, carrying passengers at 10 cents a head, continued to operate in direct competition with street cars.

In an effort to save the street cars a "zone" system was put into effect in the hope that by this system railway revenues would be increased. But losses increased under this system instead, and now buses carrying 29 passengers each have been allowed to operate on streets served by the railway.

F. K. Woodring, general manager of the Broad River Power Company, which controls the Columbia Railway, Gas & Electric Company, has entered no protest to the operation of the buses. Street car fares may have to be raised. They are now 5 cents in each zone.

The jitneys, mostly cars of a light and popular make, carry only white passengers. The buses and street cars carry whites and negroes.

Meanwhile, Columbia has three systems of transportation—buses, street cars and jitneys. Columbia is a city of about 40,000 people. It cannot support three different transportation systems.

Another Town Assumes Paving Costs

Following a conference between the representatives of the Detroit United Railway and the president of the village of Ecrose, Mich., trustees of the village accepted the offer of the railway to lay double track through the village. It is planned to start work at once.

It is understood that under the agreement the D.U.R. will lay the ties, rails and ballast, and that the village will assume the responsibility for paving between tracks. The terms of the agreement indicate that the estimated cost to the D.U.R. will be $64,000 and that the village's share will be $40,000.

The terms of the agreement were arranged by the Security Trust Company and W. C. Dunbar, receivers for the D.U.R., and A. L. Drum, operating manager for the receivers. It was reported that the company lost approximately $173,000 on the down-river lines, including Ecrose, during the year 1925. It is further reported that the loss is in excess of the deficit suffered by the Peoples Motor Coach Company, a subsidiary, which operates coaches over various lines, including the down-river towns.

Strike in Akron

Men on Akron-Canton-Massillon System and on Interurban Lines Walk Out—The Company Is Fast Restoring Normal Service

MOTORMEN and conductors of the Northern Ohio Power & Light Company operating city systems in Akron, Canton and Massillon and interurban lines connecting Cleveland and Uhrichsville, Akron, Alliance, Warren and Wadsworth refused to take out cars Sunday morning, May 2, following failure to reach an agreement on working conditions and wages. The strike was called by Edward McMorrow, representing the Amalgamated, without notifying the company or the public.

Disagreement came upon two important points:

1. The union demanded a clause in the contract which would require the company to take away the seniority rights of any employee who refused to pay his dues to the carmen's union.
2. The union insisted upon the following wage scale: One-man car operators, first three months 80 cents an hour; next nine months, 82 cents an hour; after one year, 85 cents an hour. Two-men cars, 65 cents first three months, 67 cents next nine months, 70 cents after first year. Suburban operators 1 cent an hour more than these scales. Interurban operators 5 cents more than these scales.

The union representatives also insisted that the word "employee" be written into the contract, thus covering busmen. At the last moment this demand was withdrawn. The union also insisted upon one contract covering the entire property. Heretofore four contracts have existed—one between Akron city trainmen, two with the interurban divisions and one with the Canton-Massillon city divisions.

The company refused the demands of the union. It offered to go ahead another year under the old contract.

Cars were operated by the company Sunday with employees who had dropped out of the union. Most of the city lines were filled on the Sunday schedule basis. On Monday more employees joined in operating cars and on Tuesday all runs were filled by former employees, except Wooster and Bowery.

In Canton approximately 50 per cent of the day service was operating Tuesday. No effort was made the early part of the week to operate cars in Massillon, and no interurban cars are operating. Freight is being handled by truck.

Strikers are picketing all important points in Akron, Cuyahoga Falls and Canton. The company is operating 140 buses in Akron, and this service, coupled with the car service which it has been able to establish, is giving general satisfaction, according to statements made by the big rubber concerns.

Authorities are guarding against outbreaks. Old-time methods of visiting the homes of men who are working for the purpose of getting them to join the strikers have failed. No strike breakers are being imported, but the company began Wednesday to hire men in the regular way. Inexperienced men are being put through training, while experienced men with good records are given runs.

The bus drivers are not a part of the Amalgamated Association. They have an organization of their own and have refused to join with the carmen who are on strike. Additional buses are being received by the company almost daily and are being pressed into service. Public sentiment is with the company.

In a statement issued Tuesday the company said:

> Service will be increased steadily day by day until complete service is established. In rehiring men the company plans to use extreme care. Men accepted for transportation work must come well recommended in filing applications. Preference will be given former employees with good records. Inexperienced men must go through the regular training school and pass examination before being accepted for train service. It is for this reason we ask the car riding public to be patient. Good transportation can only be built up slowly. We intend to build it to a point where it is even better than it was before the strike.
>
> We are informed by loyal trainmen who are working that efforts had been made to intimidate them. Some report that their homes have been visited and attempts made to frighten their families. Fortunately, this intimidation has had no effect. Complaint comes from car riders that they are being annoyed by strike pickets who urged them not to ride the cars. We requested patrons to ignore these pickets.
>
> All cars are manned by men who have been in our employ for some time. The public will find them courteously endeavoring to give good service. They will continue to do so even under the present trying circumstances.
>
> For the present no street cars will be operated after dark. The company does not desire needlessly to expose trainmen who voluntarily work to the limit to aid in supplying service.

Seniority rights for old employees not working ended at noon Tuesday, May 4. The men were notified that they would be accepted only as new employees in the future. The company has absolutely refused to deal any fur-

ther with the Amalgamated Association. This stand is apparently meeting the approval of the public, which has suffered great inconvenience in the past due to the strikes called by representatives of the National Association.

Interurban buses operated by the company are handling traffic between Akron and Cleveland, Akron and Canton, Canton and Massillon, Akron and Wadsworth. Arrangements have been made with the Pennsylvania-Ohio Electric Company to handle passengers by bus from Akron to Kent, Ravenna and Warren.

The present wage scale of the company for two-man city cars operators is 48, 50 and 53 cents an hour according to length of service. One-man car operators receive 4 cents an hour more than this scale. Interurban operators receive 5 cents an hour more than this scale and suburban operators 1 cent an hour more than this scale.

A. C. Blinn, vice-president and general manager of the company, on Wednesday issued the following statement after refusing to meet with Amalagamated representatives:

> This company believes car riders on its system have suffered too greatly from transportation interruptions because of the domination of its trainmen by officials of the Amalgamated Association.
>
> As the citizens of this territory know, the trainmen on this system have been called on a strike many times. Often the public has been put to great inconvenience by these strikes.
>
> The company has decided that it will no longer tolerate this domination, and, therefore, will have no future dealings with the Amalgamated Association or its representatives.
>
> We believe the public—and particularly those who are dependent upon the cars—will agree with us that the time has come to end this intolerable domination.

Cars were operating on May 7 on every line of the Akron city system and out of the rush-hour peak of 82 runs, 73 runs were made. The normal basic number required is 65. Thirteen trailers and 219 buses are in use for the emergency. Of the latter number 58 are taking care of interurban travel between Canton and Cleveland. The company is not attempting railway service at night, and it probably will be some time before it does. In the meantime buses are operating at night under six and ten minute headways. The tense condition is somewhat alleviated by the acquisition of new employees and the return of many old ones to service. The situation throughout is quiet. The backbone of the strike appears to be broken.

Electrical Experts Win Confidence at Melbourne

As preoccupied as W. H. Sawyer certainly must be with his general inquiry into the status and scope of the Electricity Commission of Victoria, Australia, and into the working of the state electricity commission acts, he has found time to endear himself to the people of Melbourne. Newspaper comment refers to his intelligent curiosity, his brisk friendliness and one opinion was ventured to the effect that "this sort of man can be more useful to Victoria than a dozen vain and rude ceremonialists." He sees much to be commended in Melbourne and Melbourne instinctively responds to him and the country he represents. By virtue of his being appointed a royal commissioner Mr. Sawyer is empowered to administer oaths, compel the attendance of witnesses and call for documents.

Mr. Sawyer, president of the East St. Louis & Suburban Railway, East St. Louis, Ill., and Herbert W. Eales of the Union Electric Light & Power Company, St. Louis, Mo., left in January for Australia to direct an extensive survey into electrical development for the Victorian government.

New Commission Members in New York Take Office

John F. Gilchrist, Leon G. Godley and former State Senator Charles C. Lockwood took office on May 1 as Transit Commissioners for New York City, succeeding George McAneny, LeRoy T. Harkness and General John F. O'Ryan.

Mr. Gilchrist, chairman of the commission by the Governor's appointment, speaking for himself and his colleagues, said he did not think it wise on assuming office to make any extravagant promises concerning what the commission proposed to do. He said:

> We are new to the problems we will have to consider and must take time to familiarize ourselves with details. The new commission will try to act and not talk.

John Hays Hammond Honored

Government officials, engineers, university representatives and prominent personages here and abroad unanimously gave tribute to John Hays Hammond, leading engineer, statesman and capitalist, on the occasion of his 71st birthday, at a dinner at the Waldorf-Astoria on May 3. Besides being a mining engineer, Mr. Hammond was one of the builders of the Cape electric trams in South Africa. With Henry A. Butters he organized the company that developed the present electrified system in Geneva, Switzerland. They also electrified the lines in Mexico City. Hailed as an internationalist, a broad thinker, a great soldier of fortune, the spirit of metalism, Mr. Hammond listened to a résumé of his career, which has been a source of inspiration for many other dreamers. It was no wonder that when he rose he said that he was overcome by the demonstration in his honor. It was the value of friendship which meant most in life—which he regarded as an opportunity to play a bad hand well. Congratulations were sent by President Coolidge, and Chief Justice Taft expressed an admiration based on 50 years of close association.

On the committee of arrangements were many prominent citizens, among them Chauncey Depew, Coleman Du Pont, Charles Dana Gibson, James H. McGraw, J. E. Spurr and William Howard Taft. All the testimonials expressing good wishes to Mr. Hammond are to be engrossed and bound in several volumes.

Seattle Men Seek Pension System

Railway men of the Seattle Municipal Railway, Seattle, Wash., are planning to present a bill to the next Legislature seeking establishment of a pension system similar to that applying to firemen and policemen. Under the present method, membership in the relief association is not compulsory. Under the former private operation of the railway lines by the Puget Sound Power & Light Company membership in the relief organization was compulsory.

The system cannot be established so as to include all the railway men without an enabling act by the Legislature, the men point out. Under the plan, however, they hope to have established a sick and injured benefit fund, a pension for retirement after a specified benefit. By including all employees of the railway in such a scheme, the men say, an adequate fund could be established.

Review of Commission's Attitude on Taxi Purchase

Chairman Ainey and Commissioners Benn and Shelby signed the document setting forth the findings of the commission in favor of the purchase of the stock of the Yellow Cab Company by the Philadelphia Rapid Transit Company, but Commissioner Martin rendered a minority report. The majority opinion declares that taxicab riders are potential car riders and that the railway has been forced to operate several unprofitable lines as a result of the competition set up in this fashion. Continuing, the commission states:

> The co-ordination of the street car and taxicab service will increase the revenue of the railway and aid it in bearing the burden of operating the city's non-paying high-speed lines; will result in considerable reduction in overhead expenses of the cab company, and will provide a more adequate and convenient distribution of the taxicab service and other transportation facilities.

Commissioner Martin bases his dissenting opinion upon two grounds. The first of these is as follows:

> The ultimate purpose is to create a monopoly of all forms of local transportation in the city, which is not conductive to the public welfare.

The second objection is found in those provisions of the contract which require that the fares and income of the Yellow Cab Company shall be included in any investigation or readjustment of the fares and income of the Philadelphia Rapid Transit Company. Commissioner Martin said:

> The trolley car system and the cab system of transportation is each a separate entity and should stand on its own feet. No sound economic reason is suggested why each separate class of riders should not pay its own bills. There is no reason why street railway fares should be increased to make up an operating deficit of the cab company, nor is there any reason why the taxicab rider should pay an added rate to help out a railway.

No steps for the immediate securing of the remaining taxicab companies in Philadelphia are contemplated by P. R. T. at the present time. Under provisions of the commission's majority order the railway will be required to make the Yellow Cab Company, now incorporated under the laws of Delaware, a Pennsylvania corporation within six months. It was further specified:

> Neither the purchase price nor any valuation filed in the proceedings shall be binding upon the commission in any further proceeding requiring determination by the commission of the value of the property and assets of either the Philadelphia Rapid Transit Company or the Yellow Cab Company for rate-making purposes.

Approval of the purchase by the commission was noted in the ELECTRIC RAILWAY JOURNAL for April 24, page 784.

News Notes

Increase in Pay Asked by Chicago Surface Men.—Employees of the Chicago Surface Lines—approximately 14,000 conductors and motormen—voted on May 3 to ask for an increase in pay of 5 cents an hour and for the establishment at the expense of the company of a $1,000 death benefit and a weekly sick benefit of $20. These demands they will seek to put into a new wage agreement to become effective on June 1.

Increased Fares May Go Before Voters.—It is likely that the question of increased fares and of changed paving requirements will be voted on at a special election to be held in the city of Ironwood. The Lake Superior District Power Company has requested permission to increase fares in Ironwood, Mich., from 5 cents to 8 cents for adults, with adults either having the choice of seven tickets for 50 cents or a 50-ride ticket book, good for 30 consecutive days, for $2.50. School children will be allowed to ride for 5 cents or seven tickets for 25 cents. Release from paving charges is also sought.

Portland Pay Car Robbed.—The pay car of the Portland Electric Power Company, Portland, Ore., was held up at 9 o'clock on Sunday morning, April 18, and approximately $14,000 in cash was obtained by the bandits. The Portland Electric Power Company has posted a reward of $1,000 for the capture of the bandits. The robbery is one of the most daring that has occurred in this city in many years.

Another Step in Franchise Negotiations.—A meeting of the board of directors of the Virginia Electric & Power Company, Richmond, Va., was recently called to act upon formal matters in connection with the company's bid on the new blanket franchise. An agreement to surrender the present franchise, a step necessary before bidding can be made upon the new franchise, was signed and will be presented to the streets committee of the Richmond City Council at its next meeting, so that action on the franchise may be expedited. The agreement also covers the provision for the sale of the power company's traction properties in the remote event that another company should be the successful bidder for the new franchise.

Parking for Philadelphia Shoppers.—A co-operative parking plan evolved by and for the benefit of the Chestnut Street Association in Philadelphia has been put into effect. It provides free parking for patrons of more than 25 stores represented in the association, and utilizes 40 garages in the locality between the Delaware and the Schuylkill Rivers and Pine and Vine Streets. In operation the plan is relatively simple. The driver of the automobile goes to the garage most convenient in the prescribed area which is using the plan. Upon leaving the car at this garage, the patron receives a claim check. The shopper then is free to go where he will and to remain as long as he wishes. At the stores where the plan is being used, the claim check is presented upon making a purchase. The store gives the patron a card, properly stamped and dated, which is presented to the garage owner or employee when the car is to be taken out. This card pays for the storage during the shopping period.

Children Will Show Ideas on Safety.—The Safety Poster Contest, opened in Atlanta's public schools on April 15, and held under the auspices of the Atlanta Safety Council, will continue until May 15. Under rules announced by the council, the contest is open to students of the fourth, fifth and sixth grades. Two prizes are offered for the best posters in each grade, a first prize of $5 and a second prize of $2.50. In addition, a prize of $5 will go to the Parent-Teacher Association of the school submitting the largest number of posters. The contest is held primarily to impress the youngsters with the importance of safety; to influence them to use every precaution to prevent accidents, and to give them an opportunity, through deep study of the subject, to display their originality in the drawings. In last year's contest more than 20,000 posters were drawn.

Foreign News

Transportation Facilities Disrupted in England

Transportation in and around London, England, is practically crippled owing to the general strike. Thousands are walking to work, while others jam the few trams in operation, the many buses and the private automobiles rushed into service. Even horse vehicles have been resurrected.

Transit facilities are improving, however. The central tube in London was running on skeleton schedule on May 5 and volunteers have come forward sufficient in number to warrant the management in announcing that service on most lines will be a reality in the near future. Trains are running after a fashion between most of the important cities and with the promise of more volunteer crews better service is expected.

Conditions appear darker in some localities than in others. In Manchester the tramway employees are solid for continuance of the strike. There transportation to nearby towns is entirely by buses and motor cars. On the other hand, in Portsmouth 50 per cent of the tramway employees who were on strike on May 4 returned to work the following morning when it was announced they would be dismissed if they failed to report for duty.

Manchester Tramway Developments.—Tramway extensions costing approximately £120,000 are now being made in Manchester, England. About £20,000 will be spent on bus purchases.

Electric Trains to Operate Over the Andes.—Work is now in progress on the electrification of the railroad across the Andes Mountains in South America between Argentina and Chile. Electrification of the Chilean section as far as Caracoles, on the Argentine border, is now under way. The cost of this project is estimated at $3,000,000.

Progress in Electrification in Austria.—Electrification of the Austrian Federal Railways is progressing as rapidly as funds are released from the balance of the League of Nations credits set aside for investment purposes. In addition to the 56 electric locomotives ordered last year, most of which are now in operation, 50 more have been ordered and delivery will be made progressively until the end of 1927. The new locomotives have axle loads of 16 tons, the former being adapted to only 14.5 tons. The roadbed is unable to support the heavier type locomotives, but it is planned to reinforce the principal portions of the main lines at a future date, particularly the Vienna-Salzburg line, in order to permit the use of a stronger type locomotive.

New Electric Locomotives in Italy.—Ten new electric locomotives have recently been ordered by the Italian State Railway authorities from the Breda Engineering Works of Milan, as a result of trials on the Rome-Tivoli-Avezzano line. Each engine has a wheelbase of 38 ft. and is fitted with two electric motors, the drive being through gearing and coupling rods to two of the axles. The machine is equipped with a transfer which steps down the 45-cycle current from the 10,000-volt trolley potential to 1,600 volts. The motors can be run either in series or parallel.

One-Way Traffic on Strand.—Part of the Strand in London, one of the world's most crowded streets, will attempt to solve its traffic problem by operating one-way traffic. No vehicles may run on the Strand beginning at Trafalgar Square. They must detour and enter it above Charing Cross station.

Electrification in India.—Calcutta and Madras are following the example of Bombay in promoting schemes of suburban electrification. Areas requiring the most urgent development by means of railway extension, according to the administration's report of 1924-25, are Burma, South India and the coal field area in Bihar and the central provinces.

Railway Superseded by Bus in Liverpool.—Bus service has taken the place of the Waterloo & Crosby Tramways, a 3-mile line on the outskirts of Liverpool, England, following the abandonment of the tramway lines. Top-covered double-deck buses will be operated along this route by a local bus company. When the lease expired for operating the tramways it was proposed that the city of Liverpool should buy the undertaking, but the plan referred to previously did not mature.

British Tramways Association.—The annual congress of Tramways and Light Railways Association will be held at Torquay, England, June 23-25.

Recent Bus Developments

307 Miles of Route in Penn-Ohio Operation

Constant expansion of the bus lines of the Penn-Ohio System, Youngstown, Ohio, has placed that company in the forefront among the railways as a user of the bus. The largest expansion has been that just recently announced in the acquisition of the property and routes of the Cleveland, Warren, Youngstown Stage Company. This added 127 miles to the Penn-Ohio system's routes and eighteen coaches to its fleet, bringing the total number of interurban coaches to 45.

Daily the regular coaches of the system traverse 5,758 miles and extra service and trippers on Saturdays and other big days often run this mileage to more than 6,000. Throughout the "home territory" of the Mahoning and Shenango valleys the bus lines extend and then northwest to Cleveland, west to Akron and northeast to Greenville, Conneaut Lake and Meadville.

Immediately after taking over the operation of the lines the opportunity to give extraordinary service was developed by arranging to take people from Youngstown, Girard, Niles and Warren direct to the Cleveland auditorium for the grand opera performances. Furthermore, seats for the opera were reserved at local ticket offices of the Penn-Ohio for persons desiring this service.

Plans are making for similar service to those desiring to go to ball games in Cleveland and also for those going from towns on the system to Cleveland to take the steamer for lake points.

The company entered the bus field on Aug. 1, 1922, with a service between Youngstown and Warren with a type of equipment that had been specially designed. The coach system now embraces 307 miles of routes.

Receiver Reports Results of Kansas City Bus Operation

The Kansas City Railways, Kansas City, Mo., sustained a deficit of $159,174 in the operation of its bus lines since the service was started last September.

The loss from September to Dec. 31 was $87,852 and from Jan. 1 to March 31, $71,322. Included in the deficit are the upkeep and maintenance of the buses, expenses for trimming trees along bus routes and other miscellaneous factors.

Francis M. Wilson, one of the receivers of the company, said:

> There is no move on to increase fares nor will there be. To increase fares would be both unprofitable and highly deplorable. The company must operate on the present fare, both for street cars and buses.

Mr. Wilson said he believed a saving could be effected by the intensive use of the double-deckers for the rush-hour period.

In making the figures public, Mr. Wilson emphasized that the reorganization group which is to take over the company at the termination of the receivership entertains no ideas of curtailing the bus service. He said:

> On the other hand, the new owners are convinced the service must be increased and Kansas City must be kept at the very front as a bus service city.

Detroit Preparing to Act

Will Exercise Power to Regulate Under Recent Court Decision — Bus Company and City Co-operate

Jitneys are being operated over the streets of Detroit, Mich., under the same regulations as before the decision was rendered by the Michigan State Supreme Court in which it reversed the finding of the Wayne County Circuit Court and upheld the validity of the Detroit ordinance regulating jitney traffic on Detroit streets. The jitney drivers have 40 days from the date of the decision in which to file a petition for a rehearing in the case.

Conferences have been held in which the Mayor, officials of the Department of Street Railways, the Rapid Transit Commission, the Police Department and the Corporation Counsel have participated, but the new regulatory ordinance planned to include jitneys, buses and taxis has not been framed by the Corporation Counsel.

Meanwhile the Highland Park Common Council has amended its city ordinances regulating jitney transportation, increasing the annual fee for jitney licenses from $15 to $25 and placing the jitney drivers under the regulatory control of the Highland Park police. Highland Park is a separate municipality surrounded by the city of Detroit, and the jitney drivers operating the Woodward Avenue route from downtown Detroit run their jitneys into or through Highland Park.

Principles which will govern future relations between the city of Detroit and the Detroit Motor Bus Company were drawn up at a recent meeting attended by representatives of the Rapid Transit Commission, the Street Railway Commission and the Detroit Motor Bus Company. Other meetings are to be held.

The representatives intend to determine the nature of all conflicts between the D.S.R. and the bus company with relation to their effect on service and the possible elimination of interference between the two systems. Also that in regard to the future situation in the city the committee agreed on the desirability of having facilities in strong hands, decentralized as to financial obligation but co-ordinated in service so as to feed to each other and reduce total investment by the avoidance of duplication. This is understood to be preliminary to the acquisition of the bus lines by the city at such a time as it completes its own trunk line system of rapid transit. It was reported that President Evans of the bus company stated that in planning expansion his company would be governed by the future needs of the city.

Competition Not Countenanced

A certificate for the operation of a bus line between Canandaigua and Geneva, via Algonquin and Flint, has been granted by the Public Service Commission. The certificate provides that the petitioners shall carry no through passengers between Canandaigua and Geneva and shall carry no local passengers in the city of Canandaigua in competition with the line of the New York State Railways in that city. The petitioners have operated between Canandaigua and Geneva for five years. The memorandum of the commission accompanying the order points out that while trolley service is probably adequate, there is need for service to accommodate the local traffic along the Turnpike Road.

More Bus Lines for Public Service

Purchase of the Rutherford, East Rutherford and Hackensack Bus Lines, Inc., and the Elizabeth-Linden and Rahway Bus Lines, Inc., by the Public Service Transportation Company, Newark, N. J., was announced by that concern on May 5. The Rutherford line operates between Rutherford and Hackensack and has permits for four buses. The other line runs between Elizabeth and Rahway and has fourteen buses.

Bus Extension in Rochester Planned

Further expansion of the bus system of the New York State Railways in Rochester, N. Y., is indicated by petitions for three new routes filed with the Common Council and a fourth with the State Public Service Commission. The applications were made by the Rochester Railways Co-ordinated Bus Lines, Inc., subsidiary of the New York State Railways.

At a hearing in Rochester before Commissioner Van Voorhis of the state body no opposition was expressed to a proposed line to skirt the northern boundary of the city and provide service to the suburb of Irondequoit on Lake Ontario. Three street car lines, the St. Paul, Clifford and Sea Breeze, would be connected with the proposed bus line. Service will be hourly and three zone fares established, with the highest fare set at 30 cents. Transfers to all trolley lines would be issued.

The three other lines, all in the city, are: Extension of the Emerson Street bus line from Lexington Avenue and Lee Road to the city line; from Lyell Avenue and Glide Street to the city line on the west side, and from Lake Avenue and Latta Road through Latta Road to city line on the north side.

All of these routes would serve newly developed outlying territory and all would act as feeders to trolley lines.

Minnesota Buses to Be Rerouted

Better routings of the interurban buses of the Twin City Motor Bus Company are to go into effect between Minneapolis and St. Paul, Minn., following a decision by the Minnesota Railroad and Warehouse Commission. This decision gives this subsidiary of

the Twin City Rapid Transit Company a present monopoly of the intercity bus service. The change affects the loops in both cities. T. Julian McGill, vice-president, will confer with retail merchants preliminary to a petition before the commission to operate a fleet of twelve-passenger buses on Nicollet and Hennepin Avenue out to Lynnhurst, which is a district south from Fortieth Street. This auxiliary service is planned to begin as soon as the new terminal building is completed, about July 15.

Further Expansion in Vancouver

The British Columbia Rapid Transit Company, Vancouver, B. C., a subsidiary of the British Columbia Electric Railway, has opened a new motor coach route between Vancouver and Chilliwack, a distance of 76 miles. Both freight and passengers will be carried.

The passenger route was purchased from G. L. Hamre, and the freight business from H. A. Thornton, both of whom have been retained in the company's employ. These routes formerly extended only to Abbotsford, but with the opening of a new road to Chilliwack, 20 miles farther, coaches now operate the entire distance.

Four trips daily each way are made by the passenger coaches and two trips by the freight trucks. Passenger coaches terminate at New Westminster, 12 miles from Vancouver, at which point passengers are transferred to other coaches of the company. Two Fageol coaches have been ordered and will replace the old acquired equipment.

The British Columbia Electric Railway operates an interurban railway between Vancouver and Chilliwack carrying both freight and passengers. The new service will cater to less than carload lot freight, leaving the through shipments to the railway.

Boston-Providence Service by New Haven

The Department of Public Utilties of Massachusetts on May 1 approved the application of the New York, New Haven & Hartford Railroad and the New England Transportation Company which is controlled by the railroad, to operate a bus line between Boston and Providence. The line would be operated to provide bus service to Boston for residents of Walpole, Wrentham, Plainville, North Attleboro and Attleboro. Local passengers between Boston and Norwood would not be carried on this line.

Northwestern Indiana Bus Service Under Way

Operation of 25 bus lines in northwestern Indiana, radiating from Gary, Hammond and Michigan City, has been formally started by the Shore Line Motor Coach Company. These coach lines were merged under the new company following the granting of a petition by the Indiana Public Service Commission. All intercity lines formerly operated by the Gary Railways, Farina's Bus Line and B. P. Shearon are included in the consolidation. The Gary Railways will continue to operate the bus routes within the city of Gary. The majority of the stock of the Shore Line Company is owned by the Chicago, South Shore & South Bend Railroad and by the Gary Railways. Charles W. Chase is president of the company. Its headquarters are in Gary. The bus lines will supplement the service of these lines and will act as feeders to them. The Michigan City-St. Joseph-Benton Harbor route schedule has already been changed to meet all through limited South Shore Line trains at the former city.

South Bend Railway Adds to Bus Facilities

Transportation service into sections of South Bend, Ind., which heretofore have had no regular transport of any kind has been provided by the Chicago, South Bend & Northern Indiana Railroad through the purchase of five new 21-passenger street car type Studebaker buses.

The whole southwestern part of the city has been without service because of the cost of crossing the New York Central Railroad tracks, soon to be elevated. A section of the southeastern part of the city also has been without service, though it has developed recently into one of the finest residence sections.

R. R. Smith, vice-president and general manager of the traction system, which covers all of northern Indiana, explained the move thus:

> We selected buses for this new service because of their flexibility and convenience and because development of the city has been so rapid there has been insufficient time for permanency of congestion to be established. As centers of population shift, the buses can follow them much more readily than the costly installation of tracks and roadbed. We already are operating a number of buses of various sizes to supplement our trackage. We keep a completely detailed cost record of their operation and consulted it when we came to buy new equipment.
>
> As a result, we chose the medium-sized equipment. We found that the larger and heavier buses were fully serviceable during only two brief periods a day. During the remainder of the day they were uneconomical. This is not a new discovery; street railroads learned the lesson when they went in for the largest sized cars several years ago. A larger number of medium sized units gives greater flexibility of equipment for handling economically the wide fluctuations in load between rush hours and off peak periods. At the same time the smaller vehicle makes shorter headways practical in the off hours without making operating costs excessive.

New Line Opened.—The Boston Elevated Railway, Boston, Mass., has opened a double-deck bus line operating from the O'Reilly Monument on Commonwealth Avenue to Bowdoin Square. The fare rate will be 10 cents, with transfer privileges at any point.

Referendum Would Postpone Permit Subject.—Demands for a referendum on the bus franchises agreed upon by the Buffalo, N. Y., City Council for the International Bus Corporation, a subsidiary of the International Railway, have prompted the municipal authorities to withhold final action on the agreement until the return to Buffalo of Mayor Frank X. Schwab, who is in Europe. The franchise for two new bus lines and an agreement to allow the International Railway to scrap three trolley lines in the city were approved by a vote of three to one by the Council in committee, but when the grant came up for final approval, strong opposition developed and action was deferred. Petitions for a referendum are now being circulated in the city.

Extended Trip on Buses.—Bus service from the end of the Washington Avenue car line at the city limits on East Second Street, North Little Rock, Ark., to Tie Plant was started recently by the Inter-City Terminal Railway. De luxe buses are used in the service. The Arkansas Railroad Commission granted a permit for the service. The bus fare is 6 cents and a transfer to the street cars 4 cents additional. Transfers from street cars are given at the same rate. With service to Tie Plant, a person may go from any point in Little Rock over the lines of the Arkansas Central Power Company and the Inter-City Terminal Railway to Tie Plant for 10 cents, and 2 cents additional for the transfer at Markham and Main Streets.

Transfer to Traction Control Expected.—Transfer of a bus line from private ownership to traction control is forecast with a petition by the Midwest Transit Company, operating between Indianapolis and Lafayette, asking the Indiana Public Service Commission to permit the Indiana Motor Transit Company, the bus division of the Terre Haute, Indianapolis & Eastern Traction Company, to take over its bus permit. The Mid-West company was the Red, White and Blue Line.

Line Started Between Hudson and Framingham.—The Boston & Worcester Street Railway started a bus line between Hudson and Framingham, Mass., on April 19. The line will take in the towns of Marlboro, Southboro and Fayville and the latter town will be the transfer point for Boston or Worcester. The company expects to continue its railway service between Marlboro and Hudson. It is also planned to operate the cross-town system of trolleys in Marlboro for the benefit of industrial workers.

Licenses Renewed and Refused.—The City Council of Westfield, Mass., has renewed three bus licenses of the Springfield Street Railway to operate buses in that city. The application for new bus routes, which the railway has had up many times since they were first requested last September, were again considered, but licenses were refused.

Railway-Bus Schedule for Suburb.—Arrangements have been completed with the Jacksonville Traction Company, Jacksonville, Fla., to maintain a regular railway and bus schedule for residents of Lake Shore, a rapidly developing suburb of Jacksonville. The bus to be used for this service is of the de luxe Pullman type. The schedule is so arranged that it meets all the requirements of the school children and shoppers who live in Lake Shore.

Tourist Bus Arrives in Richmond.—The first of the two de luxe passenger buses purchased by the Virginia Electric & Power Company intended to be rented out to tourists and for use on special occasions has arrived in Richmond, Va. The new bus is named the "Virginia." The buses cost approximately $20,000.

Financial and Corporate

Net in Seattle Cut in Half

D. W. Henderson, superintendent of the Seattle Municipal Railway, Seattle, Wash., has filed his report for 1925 with the Mayor and the City Council. The figures reveal that revenues on the railway lines are decreasing and operating expenses are growing. Passenger car revenue for 1925 was $5,851,959, compared with $6,043,981 for 1924. Operating expenses during 1925 were $5,031,917 and for 1924 $4,807,538. The income statement shows a net of $204,706 for 1925, compared with $557,243 for 1924.

At the close of the year the bonded indebtedness of the department was $13,524,500; of this $11,668,000 remained from the issue of $15,000,000 of bonds issued to cover the purchase of the lines from the Puget Sound Traction, Light & Power Company. The rest of the indebtedness was incurred in making extensions, in the purchase of the Greenwood Avenue line, construction of the Ballard line and other activities. The sum includes $176,000 in warrants issued this year for extensions. Revenue from the buses run as a part of the railway system showed an appreciable gain in 1925, with a total of $57,526, compared with $38,662 for 1924.

$2,119,120 Paid to City by Chicago Surface Lines

The sum of $2,119,120 was paid recently by the Chicago Surface Lines as the city's 55 per cent of the railway earnings during the last fiscal year. Payment was, however, made subject to a stipulation that reimbursement for $260,736 paid out of the account as income tax will be requested by the city. The city contends that the income tax settlement should only be made after the earnings are split. This would leave the city's portion tax free. In that event the tax would be paid out of the company's 45 per cent of earnings.

During the nineteen years of the present franchises the surface lines have paid into the city traction fund a total of $36,474,544. In addition to this, they have paid out $15,197,199 for street paving, $9,741,189 for street cleaning, $5,671,745 for maintenance of paving and $1,889,377 for removals of track and overhead and replacements on account of sewer installations and other underground work in the streets.

Underlying Bonds Offered to Philadelphia Riders

In order to give the car rider another opportunity to invest in the securities of the companies included in its system the Philadelphia Rapid Transit Company, Philadelphia, Pa., for the first time is offering mortgage bonds of the West Philadelphia Passenger Railway. This opportunity presented itself by the maturity on May 1, 1926, of an issue of 5 per cent bonds of the West Philadelphia Passenger Railway. These bonds are being advertised to West Philadelphia car riders through *Service Talks*, the official paper of the Philadelphia Rapid Transit Company, and are being sold through the offices of the company's securities corporation. Bonds of this kind are not usually sold in denominations of less than $1,000, but the present issue is made available in denominations of $100 and $500. The bonds were issued in 1886, at 5 per cent interest, to mature May 1, 1926. They are now extended for 30 years, with interest increased to 5½ per cent. The total issue is $750,000. The bonds available to West Philadelphia car riders represent that part of the issue presented for redemption by those who decided to accept cash instead of taking bonds of the extended issue. The new bonds are callable at 102½ per cent of par.

North Shore Net Up $79,910

Interurban Road Continues to Break Records—1925 Revenue Six Times That of 1916—Skokie Valley Route Ready Soon—47 Limited Trains a Day Between Chicago and Milwaukee

OPERATING revenue of the Chicago, North Shore & Milwaukee Railroad in 1925 was $6,850,165, an increase of $651,178 over 1924. Gross income, after operating expenses, depreciation and taxes, was $1,613,621, an increase of $302,318. Net income after fixed charges was $780,630, an increase of $79,910.

The year 1925 marked the virtual completion of the Skokie Valley route, the new additional main line that will directly connect Libertyville and Mundelein with downtown Chicago and downtown Milwaukee, and the making of large improvements in previously existing properties.

At the time the present management assumed operation of the North Shore Line, in 1916, the road and equipment were valued at $12,251,997. In the intervening period to the end of 1925 a total of $22,089,374 additional was raised from investors and spent for right-of-way, track improvement, stations, cars and other equipment, bringing the value of the road and equipment as of the end of the year up to $34,341,371.

In 1925 a total of 18,229,160 passengers, or an increase of 1,057,975, as compared with 1924, was carried. The main line railroad carried 9,814,594 revenue passengers, an increase of 354,480 over the previous year. It transported 536,095 tons of merchandise, as compared with 333,888 tons in 1924, an increase of 202,207 tons. Its express and milk departments also showed healthy increases. North Shore Line trains operated 10,989,774 car-miles, an increase of 1,107,975 miles over the previous year. This does not include car mileage of city lines.

On the Milwaukee city lines 2,787,742 revenue pasengers were carried, an increase of 175,625. In Waukegan, where the company operates both the street railway and supplemental motor coach service, 4,663,321 passengers were carried, an increase of 352,494. On the motor coach routes, operated as auxiliary to the high-speed electrically operated railroad, 963,503 passengers were carried, an increase of 175,376 over the corresponding year.

The heavy expenditures on the Skokie Valley route, under construction during the year, tended to reduce the net income. The steady growth in business is indicated by a comparison of gross operating revenue per mile of road over the last ten years:

Year	Revenue per Mile	Year	Revenue per Mile
1916	$12,688	1921	$43,528
1917	19,203	1922	48,472
1918	31,798	1923	57,498
1919	33,278	1924	59,962
1920	40,558	1925	63,251

Another interesting sidelight on the growth in the company's business is the fact that in 1925 operating revenue was six times that of 1916.

During the year the company sold $9,950,000, par value, of first and refunding mortgage 6 per cent gold bonds. It retired $60,000 first mortgage 5 per cent gold bonds, $3,500,000 one-year 6 per cent gold notes, $1,276,000 ten-year second sinking fund gold notes, $44,400 fifteen-year 7 per cent second sinking fund gold notes and $941,300 three-year 6½ per cent second sinking

INCOME ACCOUNT OF THE CHICAGO, NORTH SHORE & MILWAUKEE RAILROAD FOR THE YEAR ENDED DEC. 31, 1925

Operating Revenue:		
Passenger and special car revenue	$5,214,009	
Freight and express revenue	1,206,977	
Miscellaneous revenue	429,178	
		$6,850,165
Operating Expenses:		
Way and structures	$508,057	
Equipment	443,425	
Conducting transportation	2,182,664	
Power	579,731	
Traffic	234,805	
General and miscellaneous	1,118,272	$5,066,956
Net revenue from railway operation		$1,783,209
Net auxiliary operating revenue		86,993
Net revenue from operations		$1,870,203
Taxes assignable to railway operations		408,254
Operating income		$1,461,948
Non-operating income		151,672
Gross income		$1,613,621
Deductions from gross income		832,991
Net income		$780,630

STATEMENT OF SURPLUS

Surplus Jan. 1, 1925	$640,216	
Deduct: Sundry adjustments	242,981	
	$397,235	
Net income, Jan. 1 to Dec. 31, 1925	$780,630	
Less: Dividends paid	525,359	
	$255,270	
Sundry credits	81,089	
	$336,359	
Surplus, Dec. 31, 1925	$733,594	

COMPARATIVE INCOME STATEMENT OF CHICAGO, NORTH SHORE & MILWAUKEE RAILROAD

	1916	1920	1924	1925
Operating revenue	$1,157,191	$4,193,669	$6,198,987	$6,850,165
Operating expense	714,887	3,229,048	4,650,030	5,066,956
Net revenue—Railway operation	$442,304	$964,621	$1,548,957	$1,783,209
Net auxiliary operating revenue	.....	.....	800	86,994
Net revenue from operation	$442,304	$964,621	$1,549,757	$1,870,203
Taxes assignable to railway operation	66,038	151,746	298,609	408,255
Operating income	$376,266	$812,875	$1,251,148	$1,461,948
Non-operating income	6,208	10,332	60,155	151,673
Gross income	$382,474	$823,207	$1,311,303	$1,613,621
Fixed charges	237,996	390,196	610,583	832,991
Net income	$144,478	$433,011	$700,720	$780,630

fund gold notes and $203,000 equipment trust certificates.

Additional issues of 7 per cent cumulative prior lien stock aggregating $3,500,000 were authorized. Cash sales of prior lien stock during the year totaled $2,884,800. Quarterly dividends at the rate of 6 per cent on the preferred stock and 7 per cent on the prior lien stock were paid regularly.

With the completion of the Skokie Valley route, the company will own and operate approximately 230 miles of single track. It is significant that all of the right-of-way between Chicago and Milwaukee is entirely owned, except for short distances in a few towns aggregating about 3 miles.

At the end of the year the North Shore Line was operating 47 limited trains daily between Chicago and Milwaukee, in addition to its express and local service. Two additional non-stop limited trains were added during the year, the selection of the names being left with riders. They were named the "Northland" and the "Metropolitan." Three new express trains were also added between Highwood and Chicago. As soon as the double-tracking of the line between Lake Bluff and Mundelein was completed in July, a frequent service was started.

Parlor and dining car facilities on the limited trains continue popular. This is attested by the fact that 79,000 meals were served and 39,000 riders carried in parlor cars.

The rolling stock of the company at the end of the year consisted of 173 passenger cars, 43 merchandise despatch cars, 197 box cars and gondolas, seventeen electric locomotives and work cars and 68 motor coaches and a large number of motor trucks. All of the cars used in the Chicago-Milwaukee service are of steel. To provide for the growing traffic, 20 additional passenger cars and three more diners have been ordered at a cost of $800,000.

The merchandise despatch service is proving as popular as was anticipated. An additional convenience to the public is five merchandise despatch refrigerator cars, which will provide a service of transporting fresh meat, vegetables and other perishables to North Shore communities.

The company's motor coach business is showing a constant increase. The company has 68 motor coaches of improved type, the greater number operating upon eleven regular routes and providing a much-needed auxiliary service, particularly to residents of the countryside. In addition to the regular routes, the chartered coach business has shown a good increase.

Rehabilitation of Connecticut Line Proceeds

Plans are developing rapidly and it is expected the recently organized Danbury & Bethel Traction Company will soon be in a position to take over the old Danbury & Bethel Street Railway, which operates trolleys and buses between Danbury and Bethel, Conn.

Buses are at present co-ordinating with the trolleys with improved results. For the year 1925 the company not only paid expenses, but was able to show a net income of $29,000. This was done with a gross income lower than in 1924.

A. W. Sperry, who is engineering the reconstruction of the Danbury & Bethel company, is confident that operation can be placed on an even higher level. His further plans are said to include operation of intercity bus lines at Danbury.

Change in Control of Nashville Interurban

Control of the Nashville Interurban Railway, Nashville, Tenn., was purchased recently by Gerald B. and Lawrence Howard. The change in control has resulted in a new management to operate the 19-mile line operating between Nashville and Franklin. The present board of directors is composed of two new members, namely, Newton Cannon and Lawrence Howard. The consideration involved in the stock purchase was not stated. The outstanding securities of the line consist of $600,000 of bonds and $600,000 of stock.

Sale of Madison Avenue Surface Line Arranged

At a special meeting stockholders of the New York & Harlem Railroad, New York, ratified a contract of sale of the company's surface lines on Fourth and Madison Avenues to Charles L. Craig. The company's real estate, consisting chiefly of the carhouse site at 135th Street and Madison Avenue, is not included in the sale to Mr. Craig.

P. E. Crowley, president of the New York & Harlem, presented to the meeting a statement showing that the company's surface lines had been operated in 1925 at a deficit of $405,285, compared with a deficit of $85,911 in 1924. For two months ended Feb. 28, 1926, the deficit was $61,744. From Feb. 1, 1920, the date on which the surface lines were returned to the Harlem company by the receiver of the New York Railways, lessee, to Feb. 28, 1926, the total deficit on operation was $857,539.

Traffic, Fare and Wage Figures Reported

The increase in passenger traffic on electric railways was considerably accelerated during the month of March. The number of revenue passengers, including revenue bus passengers, reported to the American Electric Railway Association by 208 companies for the month, as compared with the same month in 1925, was as follows:

March, 1926	828,319,675
March, 1925	809,752,684
Increase	2.29 per cent

The average cash fare in 272 cities of 25,000 population and over was:

	Cents
April 1, 1926	7.6653
March 1, 1926	7.6543
April 1, 1925	7.5220

Average maximum hourly rates paid motormen and conductors in two-man service by companies operating 100 miles or more of single track.

	Average Hourly Rate (Cents)	Index No. 1913=100 (Per Cent)
April 1, 1926	56.63	207.82
March 1, 1926	56.63	207.82
April 1, 1926	56.03	205.61

Chicago Securities Analyzed

Edwin L. Lobdell & Company, Inc., dealers in securities at Chicago, have prepared an analysis of the Chicago traction securities based on the city purchase price for the properties as certified by the Board of Supervising Engineers aggregating $163,508,224 on Feb. 1, 1926. Some statistics are included on the Chicago Railways, the South Side Lines and the Chicago City & Connecting Railways. The pamphlet was prepared in view of the general interest in the subject of protective committees to represent security holders of the Chicago Surface Lines.

Abandonment in Westchester Authorized

Supreme Court Justice Morschauser, upon application of Eugene F. McKinley, counsel for Leverett S. Miller, receiver of the Westchester Street Railway, White Plains, N. Y., has authorized Mr. Miller to discontinue service at 11:30 o'clock on May 31. The railway connects Tarrytown, White Plains, Silver Lake, Greenburgh, Elmsford, Scarsdale and Rosedale. The company has been losing money steadily for years.

It is expected that Mr. Miller, who is president of the New York, Westchester & Boston Railway, will operate a bus system over the route of the railway when the Public Service Commission issues an order allowing the electric railway to abandon completely the different lines. The system includes more than 20 miles of track. Power for operation is purchased.

Mr. Miller was appointed receiver of the company several years ago and was also allowed to increase fare to 10 cents in certain zones.

Loss in St. Louis $236,051

The United Railways shows a decrease in gross revenue of $618,968 for the year ended Dec. 31, 1925. Operating expenses and depreciation were reduced $409,119, but this reduction was not sufficient to avoid a net loss for the year of $236,051 compared with a surplus of $29,988 for the year previous. Taxes were increased more than $38,000 to $1,810,701. This figure is now equivalent to 9.58 per cent of the entire gross. Including taxes the operating ratio in 1925 was 87.3 per cent. The deficit for 1925 is after all operating expense, depreciation, taxes and after setting aside $2,892,515 for interest and miscellaneous fixed charges. The deficit is credited with $1,000 from bus rentals, but the bus operations are not included in this statement.

These figures are taken from an advance copy of the receiver's annual statement issued to the ELECTRIC RAILWAY JOURNAL. Separate statement of the Missouri Electric under the same receivership management shows a deficit of $59,545 after operating expenses, taxes and $35,000 interest charges and after $9,507 deficit from bus operation. This compares with a deficit of $37,940 for the preceding year.

The management has stated that bus competition, coupled with the great increase in private automobile operation, has been responsible for the falling off of gross revenue. The greatest loss of revenue occurred in the early months of 1925. The first three months of 1926 indicate an increase of more than $30,000 in gross revenue, or 0.64 of 1 per cent.

Report Explains Condition of Long Island Subsidiaries

Pertinent facts were brought out in the 44th annual report of the Long Island Railroad, New York, N. Y., with reference to its subsidiary trolley lines.

The Glen Cove Railroad proceedings in voluntary dissolution have been completed and the receiver discharged.

The Nassau County Railway discontinued operations on Dec. 31, 1924. Proceedings in voluntary distribution are under way.

The Long Island Electric Railway and the New York & Long Island Traction Company were sold under foreclosure early this year. The Long Island Railroad was interested in these lines through holdings of securities of its Long Island Consolidated Electric Company and advances made directly to these lines to keep them in operation. These lines were purchased or built to give more service to the public, increase railroad earnings and protect the properties. The use of motors and trucks on improved highways made the electric railways unprofitable. This was the chief reason for the heavy charge to profit and loss of $2,000,000, as the investment has been entirely wiped out through dissolution or foreclosure, and, together with the New York, Brooklyn & Manhattan Beach Railway merger, is largely responsible for the decreases in "investments in affiliated companies" on the general balance sheet. The communities have had the benefit of these lines, but the burden of the losses has been thrown on the Long Island Railroad. It is explained that there is no source to which the stockholders can look for recoupment or to bear at least a part of the large outlays.

Distribution of Ohio Traction Assets

Committees of Security Holders Reach Understanding on Terms for Disposal of Company's Property

Tentative agreement has been reached by the committees representing the preferred and the common stock holders that the division in the distribution of the assets of the Ohio Traction Company, Cincinnati, be placed somewhere between 1-9 and 1-10 for the common stock and between 8-9 and 9-10 for the preferred stock. Letters mailed to the stockholders by the committees declare that no definite figure has been agreed upon as yet, but say that the members of the committees feel that some such figure as that suggested would be equitable.

The committees have extended the date for the deposit of stock to May 10. On April 20 there had been deposited 74,382 shares of the preferred out of 85,000 shares and 79,798 shares of common out of 86,550 shares. The deposits represent 87½ per cent of the preferred and 92 7/10 of the common. The committees will not adopt a final definite plan until after the last day of deposit on May 10. The letters point out that inasmuch as the deal between the Ohio Traction Company and the Cincinnati Street Railway could not have been concluded without the assent of the common stock and that any reorganization plan may require action by the common stock holders, it was felt that the common stock was entitled to participate in any distribution of the assets. The committees set forth a statement of assets of the Ohio Traction Company and its subsidiaries, the Cincinnati Traction Company and the Cincinnati Car Company, as of Jan. 16, 1926. The total assets are set forth as $9,502,141. This is approximately $112 a share on the 85,000 shares of preferred stock. The assets are made up as follows:

The committees say that as soon as a plan is agreed upon there will be available for distribution practically $1,700,000 in cash, treasury certificates and certificates of deposit. If the other assets are kept intact, there will be available for yearly distribution a substantial income as follows:

Earnings from the Traction Building for the last few years were on an average of about $52,000 a year net.

Earnings of the Cincinnati Car Company since 1922 were as follows, to wit:

1922	$177,737
1923	244,306
1924	319,420
1925	227,481

The dividends from the 86,661 shares of Cincinnati Street Railway stock for the years 1926, 1927 and 1928 will be $216,652 a year and each year thereafter they will be $259,983 a year.

It is very likely that the assets will be held in the name of a single company, presumably the Cincinnati Car Company. If this be the case and considering all the avenues of revenue, the surviving company will have approximately $500,000 a year for distribution among its stockholders. It is planned to list the stock of the new company on the Cincinnati Stock Exchange.

STATEMENT OF ASSETS OF THE OHIO TRACTION COMPANY

Cash, U. S. Treasury certificates and certificates of deposit		$1,693,168	
Cincinnati Street Railway stock, 86,661 shares (par $50) at $40 per share		3,466,440	
Traction Building—appraised value		1,404,985	
Chester Park property (land and buildings, including the Chester Park car shops) acquired from the Cincinnati Street Railway:			
Appraised value	$757,000		
Less: Leasehold	100,000		
		657,000	
Machinery and operating equipment in the Chester Park shops, appraised value		449,450	
Total Ohio Traction Company			$7,671,043
CINCINNATI TRACTION COMPANY			
Cash in banks and treasury		39,404	
Less: Reserve for unredeemed tickets and wages (estimated)		12,000	
Total Cincinnati Traction Company			27,404
CINCINNATI CAR COMPANY			
Land and buildings owned:			
Appraised value	$176,000		
Less: Leasehold	22,000		
		$154,000	
Good will, patents, etc.—appraised value		371,950	
Other assets—net value		1,277,743	
Total Cincinnati Car Company			1,803,693
Combined total			$9,502,141

Balance of Gross Income in Anderson $289,051

Revenue from operations for 1925 for the Union Traction Company of Indiana, Anderson, Ind., was $2,939,182, compared with $3,339,188 for 1924. Operating expenses were $2,541,873, against $2,656,066 in 1924. The gross income for 1925, including bus operation, was $289,051. These facts were contained in the annual report of Receiver Arthur W. Brady, submitted to the court.

Fifteen steel interurban cars of the most modern design were purchased on a lease plan at a cost of $426,091. These cars were placed in operation about Nov. 1.

The report goes into detail on bus operations conducted by the company and its extension of such service during 1925. Reference is also made to the proposed discontinuance of certain railway lines.

While operation of the lines owned by the Muncie, Hartford & Fort Wayne Railway, Indianapolis, New Castle & Eastern Traction Company and the Muncie & Portland Traction Company has been continued by the receiver and the results of such operation are shown herewith, the leases of these lines held by the Union Traction Company of Indiana have not been adopted or affirmed by the receiver. This operation is only given for the convenience of all persons in interest. The accompanying account shows tentatively the segregation of earnings and expenses of the respective companies subject to the liens of the principal mortgages and also of lines leased to the Union Traction Company.

INCOME ACCOUNT OF THE UNION TRACTION COMPANY OF INDIANA FOR 1925

Revenue from Transportation:	
Passenger	$1,964,583
Baggage	7,425
Parlor, chair and special car	8,285
Mail	4,224
Express	117,542
Milk	17,001
Freight and switching	681,238
Total	$2,800,299
Total revenue from operation other than transportation	$138,882
Total operating revenue	$2,939,181
Operating expenses:	
Way and structures	$571,129
Equipment	332,367
Power	535,600
Conducting transportation	698,672
Traffic	33,413
General and miscellaneous	370,690
Total operating expenses	$2,541,873
Net operating revenue	397,308
Taxes	125,000
Net operating revenue less taxes	272,308
Other income	52,479
Gross income	324,787
Expense of bus operation	35,736
Balance gross income	$289,050

$2,895,937 Available for Charges and Dividends

The Pacific Electric Railway, Los Angeles, Cal., reports to the Railroad Commission its 1925 operating revenue at $19,514,324, compared with $20,729,482 for 1924. The operating expenses, excluding taxes, for 1925 were $15,976,043 and for 1924 $15,932,545, leaving net operating revenue of $3,538,280 for 1925 and $4,796,937 for 1924. During 1925 taxes were $1,181,699 and for 1924 they were $1,082,586. Deducting the taxes leaves operating income of $2,356,581 for 1925 and $3,714,350 for 1924. Adding to the operating income the non-operating income of the company results in a gross corporate income of $2,895,937 for 1925 available for interest, amortization of debt discount, other fixed charges, non-operating expenses, dividends and surplus. The similar amount for 1924 was $4,006,514.

Changes in San Francisco Depreciation Reserve

The Supervisors of San Francisco, Cal., have passed to print and in due course are expected to have in effect an ordinance, long discussed, revising accounting procedure of the Municipal railway, with respect to depreciation reserves.

The present procedure is to set up 18 per cent of gross annual revenue as "depreciation reserve." From this 4 per cent goes to accident and damage claims, and an additional sum, which just now is $201,000 a year, to bond interest and redemption.

The new ordinance segregates these deductions. It makes an amount equal to 3 per cent of total capital assets deductible from gross revenues annually for depreciation reserve after operating expenses, accident and damage claims, bond interest and redemption. The accident and damage reserve is stipulated at 2½ per cent of gross revenues.

As a matter of fact, while the new system will bring the Municipal railway's accounting more nearly into accord with corporate practice, it will not materially alter the present situation except in one respect. It is proposed to start off the new depreciation and accident funds with appropriations of $100,000 each from the present depreciation reserve. This will leave more than $700,000 free for such purpose as the Supervisors see fit. They have already predicted important improvement work, including the proposed Sunset tunnel, against it, but there is talk of a $2,000,000 bond issue to accomplish this work.

Under the present depreciation reserve system $588,000 was set aside in 1925, but after caring for bonds and accident claims, only $266,062 remained for the actual depreciation fund.

On the basis of last year's capital assets, which were figured at $7,992,410, the depreciation deduction under the proposed system would have been $239,772.

Net Income in Allentown Increases

The consolidated income account of the Lehigh Valley Transit Company, Allentown, Pa., for the year ended Dec. 31, 1925, shows an increase of $71,864, with operating expenses $74,411 below those of last year. The net earnings from operation increased $146,276 for the year. In the annual report to the stockholders P. B. Sawyer, president, says this condition was due entirely to a temporary increase in the sales of surplus power and offset a further substantial falling off in street railway business during the year.

The property has been adequately maintained and an allowance set aside for depreciation which more nearly meets the company's requirements in that regard. Equipment trust debt to the amount of $30,000 has been retired and the cash position of the company improved.

A 5-mile relocation to private right-of-way on the Philadelphia division has been constructed at a cost of approximately $450,000. This reduces the Allentown-Philadelphia running time five minutes, relieves the company of a constantly growing highway accident liability and removes the obligation of track paving along the route that was formerly traversed.

Mr. Sawyer also refers in the report to the incorporation of the subsidiary, known as the Lehigh Valley Transportation Company, which now has in operation three passenger buses running over two routes to provide for the increase in population of the territory served. The accompanying table shows the income account for the year ended Dec. 31, 1925, compared with the year previous.

CONSOLIDATED INCOME ACCOUNT OF THE LEHIGH VALLEY TRANSIT COMPANY AND SUBSIDIARIES

	1925	1924
Total gross earnings	$5,047,104	$4,975,240
Total operating expenses including taxes	3,603,062	3,677,474
Net earnings from operation	1,444,041	1,297,766
Income from interest on bonds	906	1,861
Income from interest on notes and deposits	3,618	7,057
Income from dividends on stocks	110,075	111,075
Total net earnings	1,558,642	1,417,761
Depreciation allowance	377,798	231,453
Interest—funded debt	599,802	600,949
Interest—floating debt	.....	31,119
Amortization of discount and expenses	21,705	21,705
	999,306	885,227
Net income	$559,335	$532,534

	Total Operating Revenue	Total Operating Expenses	Taxes	Other Income	Gross Income
Union Traction	$1,384,629	$1,252,857	$46,925	$24,084	$108,931
Indianapolis Northern	743,810	586,512	29,837	16,512	143,972
Muncie, Hartford & Fort Wayne	255,680	209,362	13,450	3,450	36,318
Muncie-Portland	101,349	88,026	6,087	1,056	8,292
Indianapolis, Newcastle and Eastern	275,271	223,141	10,312	4,295	46,121
Muncie-Union City	103,914	103,247	10,237	1,652	*7,918
Marion-Wabash	56,042	58,432	5,300	1,024	*6,665
Anderson-Middletown	18,483	20,292	2,850	401	*4,256
Total	$2,939,181	$2,541,873	$125,000	$52,479	$324,787

*Deficit.

Bondholder's Plea Rejected. — The United States Supreme Court has refused to review the case of Milton Von Boston, an Eastern bondholder of the United Railways, St. Louis, Mo., who sought to intervene in the company's receivership suit. Previously his petition had been denied by United States District Judge Faris and the United States Circuit Court of Appeals. Mr. Von Boston sought to have declared due and payable the $30,000,000 issue of general mortgage bonds. Judge Faris in dismissing his petition held that the acts complained of had not constituted a breach which gave him the right to enforce the foreclosure terms of the general mortgage.

Deficit of $156,887 for Three Months. —The Eastern Massachusetts Street Railway, Boston, Mass., reports to the Department of Public Utilities, for the quarter ended March 31, 1925, a net income of $277,204, after fixed charges, equivalent after sinking fund and preferred dividends to 72 cents a share on the 84,698 shares of common stock outstanding, as compared with $241,262, or 29 cents a share, in the corresponding quarter a year ago. After payment of dividends the deficit was $156,887, compared with $191,338. As of March 31, 1926, current assets stood at $3,264,920 and current liabilities $798,066, leaving net working capital of $2,466,854.

Change in Financial Structure Sought. — The Jamaica-Central Railways, Inc., has filed a certificate in the office of the Secretary of State of New York, changing the par value of its stock from 2,000 shares, $100 par value, to 2,000 shares, no par value. This company was recently organized for the purpose of rescuing three routes in Long Island which were to be abandoned. These lines were controlled by the Long Island Electric Railway. Reference to the Jamaica-Central Railways was made in the ELECTRIC RAILWAY JOURNAL, issue of April 3, 1926, page 606.

Interest Money Advanced.—W. F. Turner, president of the Oregon Electric Railway, Portland, Ore., stated that prompt payment would be made this year on May 1 of the semi-annual interest on $2,000,000 of 5 per cent bonds of that company. The electric line has not been earning its interest, but the parent line, the Spokane, Portland & Seattle Railroad, of which Mr. Turner is also president, was expected to advance the money to meet the obligation. The Oregon Electric is a valuable feeder from the Willamette Valley.

New Directors of United Light and Power.—Further changes are announced in the directorate of the United Light & Power Company, Chicago. Two new directors were elected. They were R. B. MacDonald, vice-president of the Tri-City Railway & Light Company, a United Light subsidiary, and H. C. McClintic of McClintic & Marshall, structural steel firm of Pittsburgh. They succeed Bertrand A. Howe and Warren A. Snow of Howe, Snow & Bertles, Inc., a company which in the past has participated in United Light financing. Other new directors elected since Mr. Hulswit's resignation as president were H. B. Rust, J. S. Brookes and Richard Ingliss, representing the Koppers Company and Otis & Company.

Increase in Traffic for First Quarter. —Revenue passengers carried by the United Railways, St. Louis, Mo., showed a gratifying increase during the first quarter of this year, according to a report filed with the City Register's office on April 19. The report covering the three months ended on March 31 shows the company operated on an average of 1,224 cars daily, made 1,447,990 trips, traveled 9,423,687 car-miles and carried 64,686,265 revenue passengers. In a similar period in 1925 the company used on an average 1,250 cars daily and hauled 64,478,098 revenue passengers.

Book Reviews

Electric Railway Engineering

By C. Francis Harding, professor of electrical engineering, assisted by Dressel D. Ewing, professor of electrical railway engineering, both of Purdue University. Third edition. McGraw-Hill Book Company, Inc., New York, 1926. $5.

This textbook is now in its third edition, the first having been published in 1911. In the preface it is stated that "although the fundamental principles underlying the operation of electric locomotives, cars and trains have not changed materially since the publication of the second edition of this book in 1915, the variety and type of their applications to practice during the past decade, as well as the new statistical data now available, seem to warrant a completely revised and enlarged third edition." Following out this idea, a new chapter has been added to introduce some of the economic problems involved in bus transportation, while the chapter on power station location and design has given way to one on sources of electrical energy.

It is unfortunate that the authors did not find it possible to bring some of the important chapters of the book more thoroughly up to date. For instance, in the chapter on "Traffic Studies—Predetermined" the tabulation on electric railway statistics is taken from the United States census on street and electric railways for 1907. Save for a paragraph on bus competition, the text in this chapter is virtually unchanged from the previous edition. On page 26 the statement is made that "a well-conducted road may safely be assumed to earn 20 cents per car-mile." While this may have been true in 1911, it does not depict present-day conditions.

The chapter on cars shows a particular lack of revision to meet modern practice. While a few sentences have been added to certain paragraphs, there are many statements that are not in keeping with the present. Such statements as the following indicate failure to appreciate the situation: "In the large cities the convertible or semi-convertible double-truck cars . . . are still being used, although many of them have been equipped with the various prepayment devices." "The stepless, center-entrance car introduced in New York City a few years ago is becoming an extremely popular type of car for service in large cities." "Several companies operating in large cities have again introduced types of double-deck cars." "During the last few years the Birney safety car has become exceedingly popular." "Open running board cars are used much more in the East than in the Middle West for suburban service." "The great improvements made during the last few years in storage batteries, bearings and light mechanical parts, brought about largely by the wonderful development of the modern automobile, have contributed much to the success of this type of car for certain classes of service. In 1913 there were 280 of the cars in use. . . . The number has increased considerably since then."

In using the book as a reference or as a text, therefore, care should be taken not to use directly the reference to practice, since the revision has left a large part of the material fully ten years behind the present state of the art.

French-English and English-French Dictionary

By J. O. Kettridge. The H. W. Wilson Company, New York, N. Y. Two volumes, 1,160 pages. From London, $12.50; from New York, $14; Vol. I—French-English, $7.50 postpaid from New York.

This dictionary contains technical terms and phrases used in civil, mechanical, electrical and mining engineering and allied sciences and industries; also a method of telegraphic coding by which any entry in the dictionary can be expressed by a ten-letter cipher word with indicator and check. It contains the translation of 100,000 words, terms and phrases, illustrated by numerous instructive examples and explanations, the whole arranged on original plans in progressive alphabetical order in the readiest form for rapid reference. Many libraries and technical departments of colleges have ordered this dictionary for their reference shelves.

Statistics of Railways in the United States

Thirty-eighth annual report, for the year ended Dec. 31, 1924. Prepared by the Bureau of Statistics, Government Printing Office, Washington, D. C. 112 pages. 15 cents.

The text of this report contains statistics based on the monthly reports of railways for the year 1925, as well as selected data relating to other common carriers subject to the interstate commerce act for the years 1924 and 1925.

Although the title "Statistics of Railways in the United States" is retained, certain tables relating to other classes of common carriers subject to the interstate commerce act are also included. Because of the necessity for the greatest possible economy in printing expense, the usual section of the report giving a detailed list of securities owned and outstanding has been omitted, as was also done in the case of that for 1923. Accident statistics have been omitted from this volume.

Personal Items

H. L. Mack Leaves International

Executive of Buffalo System Plans to Enter Contracting Business for Himself

H. L. Mack, vice-president of the International Railway, Buffalo, N. Y., has resigned, effective May 1, to enter the general contracting and engineering field. Mr. Mack has been connected with the street railway system in Buffalo since 1892, when he became a lineman for the Buffalo Street Railway after several years of experience with the Big Four Railroad. Three years later he was placed in charge of this department. Later the department



H. L. Mack

took over the construction and maintenance of all track, bridges and buildings of the International system.

In March, 1923, Mr. Mack was elected vice-president in charge of engineering and a director of the International Railway. The construction of the Buffalo-Niagara Falls high-speed interurban line was under the supervision of Mr. Mack and he also supervised the construction of the Lockport-Olcott interurban division. He has seen the Buffalo street railway system grow from a road of 90 miles to a system of more than 400 miles in Buffalo, Niagara Falls and Lockport, with interurban lines reaching into more than a score of communities in western New York.

In his letter of resignation to B. J. Yungbluth, president of the International Railway, Mr. Mack said:

> For many years it has been my ambition to enter the contracting business for myself, but each time that I have come to the decision some crisis in the affairs of the company has kept me in service, forcing me to lay aside my personal plans. I now feel that the time has arrived when I can carry out this purpose without seriously disorganizing the work of the company, and therefore ask you to accept my resignation as of May 1. My interest will always be with the International and I hope you will feel free to call upon me whenever you think I may be of service.

Mr. Mack is recognized as one of the leaders in his line in the country. The catenary type of construction developed by him for the Buffalo-Niagara Falls high-speed line attracted much attention in the engineering world.

Personnel Changes in Nashville

G. B. Howard has replaced John H. Carpenter as president of the Nashville Interurban Railway, Nashville, Tenn. The new president and his brother, Lawrence Howard, who will assume the position of secretary and treasurer, are sons of the late J. W. Howard, one of the group that built the railroad, which began operations in 1908.

John A. Pitts remains as vice-president.

J. E. Napier, formerly assistant treasurer, has been made general manager. Mr. Napier has been long connected with the enterprise in the offices at both Franklin and Nashville.

The Nashville Interurban Railway operates 19 miles, connecting Franklin, Grentwood, Nashville and Mount Pleasant.

M. J. Curtin Promoted by Boston Elevated

M. J. Curtin, tie and timber agent of the Boston Elevated Railway, Boston, Mass., has been appointed to the position of supervisor of stores and yards of that company. Mr. Curtin has been connected with the Boston Elevated Railway for twelve years. He went to work for the company as a sub-foreman on track construction. Later he was construction foreman at the carhouses and on building work. He has been tie and timber agent for the past six years.

Mr. Curtin's experience covers a wide range of work in the contracting field. He is a high school graduate and did his first work in engineering in the drafting room of a contracting firm. He entered street railway work with the old Bay State Street Railway, now the Eastern Massachusetts Street Railway. Eventually he became civil engineer of that company. His experience in this line of work also covers a period during which he was foreman for contractors engaged in important street construction work. He has been a member of the committee on wood preservation of the American Electric Railway Engineering Association for several years.

H. G. Tulley Heads Cab Company

Mr. Tulley recently returned to Management, Inc., has been elected president of the Yellow Cab Company of Philadelphia, Pa., recently taken over by the Philadelphia Rapid Transit Company. In this capacity he replaces W. E. McGuirk of New York.

Mr. Tulley, recently returned to Philadelphia from Buffalo, where he was associated with the International Railway. He went with Mitten Management in Philadelphia fifteen years ago. He was one of the important factors in the rehabilitation of the Philadelphia Rapid Transit System.

A. J. Challeen on Detroit United

New Superintendent of Equipment Progressive and Alert on Things Mechanical

A. J. Challeen has succeeded Hugh Savage as superintendent of equipment and shops for the Detroit United Railway, Detroit, Mich. In his new post Mr. Challeen has been devoting particular attention to improving the appearance of the rolling stock of the company. This he has sought to do through the use of various painting effects so as to give a streamline appearance to cars. As a result he has made some of the older type equipment particularly attractive. In addition to car maintenance, Mr. Challeen has also



A. J. Challeen

been devoting special attention to bus maintenance and to improving the riding qualities and appearance of the buses operated by the Detroit United Railway. This, of course, is the esthetic side of the matter. There is, however, another side, the purely utilitarian. Mr. Challeen knows that, too. He is particularly well informed in regard to car design and various types of car construction.

Mr. Challeen was born in Rush City, Minn. His scholastic training included special courses in mechanical and electrical work at the University of Minnesota. He then entered electric railway work with the Twin City Lines. This was in 1908. In 1912 he was made general repair foreman in one of the outlying shops of the company. In 1921 he was advanced to general foreman of the principal repair shop of the Twin City Company. In March, 1925, he left the Twin City Company to take up duties as mechanical superintendent under A. L. Drum of the Light-Weight Noiseless Electric Street Car Company. Since June, 1925, he has been with the Detroit United Railway, of which Mr. Drum is manager for the receivers. Mr. Savage, who was succeeded at Detroit by Mr. Challeen, resigned from the property there to become connected with the Brooklyn City Railroad.

Utility Man Is Pine Bluff's Most Useful Citizen

Harvey C. Couch, president of the Arkansas Light & Power Company, Pine Bluff, Ark., and interested in other large projects for the development of Arkansas and the south, has been declared Pine Bluff's most useful citizen and has been selected to receive the Chamber of Commerce good citizenship award of 1925, for which he will be presented the *Commercial* loving cup.

The award was made to Mr. Couch on the grounds of his great and untiring efforts for development of Pine Bluff and Arkansas, particularly with reference to electrical power developments. Mr. Couch is actively identified with all civic movements for the betterment of city and community and an untiring worker in the Chamber of Commerce.

In an editorial headed "Honored in His Own Country" the Pine Bluff *Commercial* on Feb. 16 said:

> Many signal honors have been visited upon Harvey C. Couch, empire builder, dreamer of dreams that come true and mighty factor for progress in this, the wonder state. And not the least of these is the awarding of the Pine Bluff good citizenship trophy, voted to Mr. Couch by the unanimous voice of a committee representing every activity, every walk of life and every phase of community life in Pine Bluff.
>
> This award would be significant if for no other reason than that it is proof positive that Pine Bluff is not unappreciative of the efforts made by Mr. Couch for the progress of this city, proof that this city realizes the door Mr. Couch has opened to opportunity and development and proof that all prophets are not without honor in their own country.

Richard Schaddelee Heads United Light Group

Much interest attaches to the career of Richard Schaddelee, who recently succeeded Frank T. Hulswit as president of the United Light & Power Company, Chicago, an organization with public utility holdings wide in their ramifications, particularly in the Central West. Not only is Mr. Schaddelee camera shy, but heretofore he has successfully eluded the seeker of biographical facts. Despite the load that he has long carried as an officer of the United Power & Light, this man, who rose from $20 a month as a meter reader and bill collector to the presidency of a great corporation, has escaped the public eye.

Born in the Netherlands in 1873, Mr. Schaddelee came to the United States at the age of fourteen. The excellent schools of his native country laid the foundation for a remarkable self-acquired education. Aside from a few weeks in the public schools of Holland, Mich., he had no opportunity for study and higher education, so far as schools were concerned.

Working for a carpenter in the Michigan village, his first wage was $1.25 a week. When the family moved to Grand Rapids the boy found work in a furniture factory, where he spent two years, in which time he learned to speak and write the English language.

Several jobs intervened before he went into the employ of the Gas Light Company of Grand Rapids, Mich., in 1892, at a salary of $20 a month. As a meter reader and bill collector, he showed unusual ability in collecting bad accounts. He advanced through various office jobs to the post of cashier and head of the credit department.

His reputation for doing things and getting results won an appointment by bankers of Grand Rapids to take charge of a small gas plant at Albion, Mich. His success as a manager settled him in his life work and started him on his long road to national prominence in the public utility business.

Among the United Light properties are several electric railways operated in towns of medium size. Their problems have always received Mr. Schaddelee's earnest attention. He has felt that the occasional rider on the electric railway should pay more for the service than does the man who uses the road habitually. He has given expression to these views many times, and has embodied the principle behind them in a form of commutation ticket which he worked out successfully for application on several of the properties included in the United Light & Power group.

Obituary

Victor Angerer

Victor Angerer, vice-president of the Taylor-Wharton Iron & Steel Company and a vice-president and a director of the subsidiaries of that company, William Wharton, Jr., & Company, Easton, Pa., the Philadelphia Roll & Machine Company, Philadelphia, Pa., and the Tioga Steel & Iron Company, Philadelphia, died on May 5. He had been connected with these companies and their predecessors since 1884.

Mr. Angerer was one of the foremost authorities in the United States on special trackwork. Twenty of twenty-five years ago he was working on problems the solution of which is just being accepted today. In the course of his career he designed many switches and frogs and special trackwork devices. He made many experiments, particularly in connection with the so-called Trilby rail. He also gave a great deal of attention to the proper design of other rail sections, particularly of rails and guards for curves. His studies of the question of the fatigue of steel won for him high recognition in scientific circles.

He was very openminded in his approach to problems presented to him for solution, and particularly in committee work established a reputation for himself by his consideration of others who advanced ideas not always compatible with his own. His scientific interest in the problems with which he was concerned always transcended his interest in them as a manufacturer, and no little credit is due to him for his advancement of the science of track engineering. He was always seeking out the reasons for things, and by himself, but primarily in the interest of his own company, conducted early in 1925 a survey of conditions to determine the present status and future prospects of the electric railways. Like him he applied some tests to this study that were new. And then he unselfishly made public his findings through the ELECTRIC RAILWAY JOURNAL for the benefit of the entire industry. Incidentally it might be mentioned that this was only one of his many contributions to the literature of the industry made through the JOURNAL.

Born in Vienna, Austria, on June 4, 1861, Mr. Angerer was educated at the Technical College in Vienna. His first work in the United States was as a draughtsman with William Sellers & Company where he remained four years. He then entered the employ of William Wharton, Jr., & Company as mechanical engineer. In 1886 he was made chief engineer of that company, superintendent in 1889, second vice-president and works manager in 1897 and vice-president and general manager in 1902. When the firm was consolidated with the Taylor Iron & Steel Company in 1912 he was made vice-president of the Taylor-Wharton Iron & Steel Company.

Mr. Angerer's A.E.R.A. committee activities date from 1920. Since then he has been a member of the committee on way matters. Prior to 1920 he gave the committees the benefit of his advice and help, but he did not participate in the proceedings as a member because such formal participation by manufacturers was not then countenanced. In 1923 he was also a member of the special committee appointed to develop standard wheel and rail contours. More recently he was a member of the newly-organized way and structures committee and at the time of his death was chairman of a special committee on the design of steam and electric railway crossings. In addition to these activities with the A.E.R.A. Mr. Angerer has been chairman since 1923 of an A.E.S.C. sectional committee to develop American standards specifications for special trackwork material and also standard designs for 7-in. T-rail for use in paved streets. He was a member of many other scientific and engineering bodies.

Thomas Millen

Thomas Millen, who was master mechanic of the Metropolitan Street Railway, New York, from 1894 to 1908, died on May 1 in New York at the age of 77. Prior to his connection with the Metropolitan Street Railway, Mr. Millen's experience had been with steam railroad companies, including the Central Railroad of New Jersey, Delaware, Lackawanna & Western Railroad and New York City & Northern Railway. He was connected with the Metropolitan Street Railway during the time that the lines of this company were electrically equipped and when experience with the underground conduit system was very meager. This meant that important problems in the selection and maintenance of large quantities of rolling stock had to be undertaken under Mr. Millen's direction. His ability is shown by the fact that much of this equipment and many methods adopted at that time are in use at the present day. Mr. Millen retired from the railway business when he left the Metropolitan Street Railway.

Better Merchandising Is Bringing Results

Local Transportation Industry Is Moving Forward Rapidly—Equipment Purchases Are Expected to Be Double Last Year's—Broadened Conception of Their Part in Community Life Giving Transportation Men New Incentive

AN INTERVIEW

By Charles Gordon

"THE trend of thought and effort at the present time among executives, engineers and operating staff officers of our electric railways is directed toward a grasp more embrasive of the whole transportation problem. In the past, engineering considerations were largely the governing factors. Measures for securing the absolute minimum in power consumption, first cost and maintenance, combined with the greatest possible durability, were of major interest. Recently, however, attention has been directed to the car unit from the broader viewpoint of its business-getting possibilities. In general, it may be stated in a sense that electric railway equipment in the past has been somewhat over-engineered, and, if we may coin an expression, "under-merchandised."

With this introduction Myles Lambert, transportation sales manager Westinghouse Electric & Manufacturing Company, started his reply to my first question regarding the tendencies in electric railway equipment design. From this point on my task was relatively simple. The subject opened up the entire field of the electric railway outlook, and there I had struck into a subject on which Myles Lambert stands out as one of the most progressive thinkers in the industry.

"The effort toward the reduction of weight started a decade or so ago," he continued, "and the consequent reduction in power consumption, has been a healthy influence in the direction of greater efficiency. This was particularly true on properties where the Birney type of ultra-lightweight car was applied to give more frequent service and at the same time to effect operating economies as the only available means of showing improved net results at the end of the year.

Lack of Co-ordinated Effort in Design

"A few years ago Britton I. Budd directed a broadside at the electric railway equipment manufacturers by telling them that they were more or less 'asleep at the switch.' Aside from some progress in weight reduction and a few other improvements, he said that we still have about the same old car that we had ten or fifteen years ago. Against this he contrasted the progress that has been made by private automobile and bus manufacturers in improving the performance, attractiveness and comfort of their vehicles.

"It was pointed out to Mr. Budd at that time that there is a great difference between the two enterprises because the automobile has developed a large quantity demand, enabling the manufacturers to enjoy 'quantity production' costs and resulting profits. A goodly share of this profit has been used further to advertise and merchandise that industry. Such 'quantity demand' has never existed for electric railway cars. The total number of street cars in the United States is far less than one year's output for any one of the larger automobile plants, and, in addition, such a thing as a standard street car is unknown. In a word, the automobile industry is on a manufacturing basis, while the electric railway car is built on a special design, 'job building' basis.



Myles Lambert

"The bus has been helped in design by the competition among manufacturers for a new market which has offered the incentive for commercial engineering minds to concentrate on producing complete vehicles designed throughout for a specific objective. In contrast to this the electric railway car has been developed by several independent groups of engineers, each group acting and thinking largely about that part of the car equipment for which it is responsible. The railway operating engineer has followed the practice of specifying in general the construction of car body and trucks, frequently issuing exact specifications. Manufacturers of other parts of the equipment have thus been obliged to build their product to suit the particular car weight, truck, axle dimensions and schedule speeds specified. In every job the motor size varies with all of these factors and, in addition, with the grades and other operating conditions in each city for which the cars are destined. Hence electric railway car development has been retarded by lack of co-ordinated effort toward a unified design and has of course suffered in comparison with the automotive vehicle as a result.

"Mr. Budd's discussion of the subject did its part in exciting further thought and activity not only in the direction of more attractive car designs but it also stimulated interest in the subject of better co-ordination in design effort among all the manufacturers who share in the production of the apparatus that is embraced in the complete car. Mr. Storrs is now promoting the effort to bring about greater co-ordination of manufacturing effort, as an association activity.

Commercial Engineering Now Rules Car Design

"Power consumption, weight, first cost, low maintenance and durability are of course still important factors in car design, but they are no longer the ruling factors. The primary considerations today are the things that determine the business-getting possibilities of the car for a given service. For example, rapid acceleration and high schedule speeds are now considered far more important than power consumption. Comfortable, attractive cars are of more importance than first cost and low maintenance. The entire subject must be approached from the commercial angle of determining what practice will give the greatest return on the entire investment. If a more comfortable and attractive car will draw sufficient additional business to give increased profits, even though first cost is increased, business logic leaves no other choice. In addition to the other factors named, reduction of noise is an important step toward better merchandising. Noise is a natural accompaniment of a motor arrangement in which a large proportion of the weight is not spring-suspended."

Mention of noise reduction opened up a subject that has apparently received more attention in Europe than in the United States. It was also a subject on which Myles Lambert is particularly qualified to talk from his intimate association with the development of existing forms of electric railway apparatus in this country. His views represent an intensely practical experience and keen vision. He denies the right to be classed as an engineer, yet his function for many years was to make the product of engineers perform

satisfactorily under actual service conditions. Thus his views are founded not on theory, but practice.

Myles started his active association with the local transportation industry in Brooklyn. Electric power for rapid transit lines in Greater New York was initially tried on the old Kings County "L" system in 1898, where Mr. Lambert later held the position of division superintendent. He had risen rapidly to this post of responsibility from a job as ticket agent and telegraph operator, with a previous background of odd jobs such as a farm boy of fifteen was able to grow into. As a messenger, tower helper and brakeman on the Long Island Railroad he had managed to pick up a knowledge of telegraphy which enabled him to get employment with the "L" system in Brooklyn.

But electrification brought him a new outlook. In 1900 he resigned from his hard-won position to take an apprentice course in the Westinghouse plant at East Pittsburgh. On its completion after two years he was made a supervisor of railway equipment installation and construction work and was assigned for a year on the Boston "L" system. He had charge of the work on the sample car equipped with Westinghouse apparatus on one of the first New York subway cars, also the re-equipment of the Metropolitan Elevated in Chicago when it was changed from "L" type control to multiple-unit operation. In Chicago he also supervised the work of equipping a group of new cars on the South Side elevated lines to operate in trains with the original Sprague control equipment.

Mr. Lambert moved forward steadily in the Westinghouse organization. From service activity he was placed in charge of railway equipment sales at East Pittsburgh and later was made assistant manager of the railway department. He was again moved up to manager of the department, and in that position has kept in intimate contact with the industry in which he pioneered. He has recently been made transportation sales manager in charge of all transportation sales for the company; heavy and light railway, marine, automotive and mining. Although primarily an electrical man, he takes a broad view on local transportation, holding that anything which contributes to the development of transportation is of benefit to all industry in that it contributes to the development of cities which have made modern industry possible.

Considers Transportation as True Public Service

He looks on the work of the transportation man as being in the broadest sense a true public service so tied up with the welfare of the country as to call for the highest degree of devotion and skill. Myles Lambert practices what he preaches and is never too busy to devote his time and fertile mind to the upbuilding of the industry. He has won added respect and esteem by his readiness to put aside commercial expediency in favor of what he considers to be in the interest of the industry's welfare.

Noise reduction opened up the whole question of the fundamentals of motor mounting and truck arrangement. I asked Myles for an opinion on the possibilities of worm or bevel gear types of drive in which the motor may be detached from the axle and mounted either in a spring-suspended sub-frame on the truck or on the car body directly.

"Research work up to the present time," he said, "indicates that a worm-driven motor vehicle, while less noisy than the present construction, does not meet the propulsion requirements of American operating practice. At the same time such forms of construction tend to be much more expensive than the present simple arrangement and offer serious difficulties to convenient maintenance and rapid repair.

Reduction of Unsprung Weight Is Possible

"There is, however," he continued, "a possibility of developing a form of motor suspension that, while carrying the motor on the axle, would nevertheless make it entirely spring-suspended. Reduction of the amount of weight now unsprung does not necessarily require a wide departure from the present arrangement of motors in trucks. On single-truck equipment the worm or bevel drive construction may prove satisfactory. But on double-truck cars it presents serious complications and difficulties in construction."

"Since a considerable part of car noise is attributable to the effects of worn bearings, particularly at the axle, what opportunities do you see for the introduction of anti-friction bearings to car construction?" I asked.

"The combination of such bearings on armature and axle would have the advantage of maintaining gear alignment and consequently reducing noise and vibration. However, such construction without other improvements at the same time would not relieve the unsprung weight situation. This would be serious on the bearings themselves, would produce complications in motor design and would present several maintenance difficulties."

"What, then, do you anticipate in the line of improving the present arrangement of driving mechanism," I persisted.

"I believe that improvement will be in the general nature of reducing the present amount of unsprung weight, while at the same time retaining the principal features of the present simple construction. Such development is unquestionably on its way."

There was room for more discussion here, but there were many other questions of moment on which I wanted Myles Lambert's views. Consequently I switched back to the question of merchandising service.

"What are your views on the possibilities for improving transportation on street railways so as to attract riders who now use private conveyances?" I asked.

"There are both geographical and social considerations that must be taken into account. In an industrial district, for example, speed and frequency of service are the ruling considerations. Here the rate of fare is an attraction. In residential sections comfort and attractiveness take precedence in building patronage. The fare becomes a secondary consideration."

"What do you foresee for business in the electric railway field during the present year?"

"From the interest in new equipment manifested by active inquiries now coming in, which are a result in large part of the aggressive advertising and better selling within the industry, it is a conservative estimate to say that equipment business for the present year will more than double that of last year. In my judgment the industry is genuinely interested in the improvement of its cars. Business conditions for the manufacturing side of the industry are definitely on the up-grade."

"Do you think this is just a spurt or that this improved condition will continue?" I persisted.

"Samuel Insull answered that question recently in his address before the Advisory Council conference in Chicago when he said emphatically that one of the principal troubles with the electric railway industry has been that many properties lack the courage to provide the equipment needed to bring them back to a sound earning basis. To my mind the present activity in the electric railway market is a definite indication that many railway managements have determined to provide improved facilities as the solution to the problem of increasing railway revenues. I am convinced that this movement is rapidly gaining momentum and that the improvement of local transportation properties will continue to accompany the expansion and economic development of American communities. Without adequate transportation facilities modern cities cannot grow normally. The improvement program now getting under way will quickly make itself felt in the public mind. Effective demonstration of the advantages of improved transit facilities will lead to a new basis of co-operation between the transportation companies and the public they serve.

Renewed Courage in Industry

"Electric railway executives are acquiring renewed courage and a broader grasp of the whole local transportation problem. They are prepared to utilize any type of vehicle or equipment that is best suited to a particular service requirement. There is no question but that a demand for more and better transportation service exists in every community. With the continued growth in population that is taking place this demand is bound to increase. Adding to this the resulting business development that must ensue, there will be a corresponding growth in the demand for new and better cars and buses. There is still much to be done and some properties are slow in starting, but present tendencies make the future look bright indeed."

"Assume that both manufacturers and operators will push the matter of better equipment and more intensive merchandising of this improved service," I asked, "what other factors require increased attention at this time in order to push the industry forward toward improved conditions?"

The answer came quickly. Myles seemed prepared for my question.

"There is a need for a more profound economic knowledge of the transportation business by the rank and file of the manufacturers' representatives serving the industry and similarly by those throughout the operating organizations of transportation companies," he declared. "This large group of several hundred thousand individuals all need to have a clearer conception of the part which transportation plays in our everyday economic, social and industrial life. They need to become more interested as individuals in the improvement of transportation service. Either choice or chance put them into this most fascinating service to modern society.

"Every individual has his duties and obligations in the modern social structure, but transportation is an underlying basic service upon which the very existence of the modern community depends. Transportation men in every city need a more vivid conception of the part which they play in their everyday duties as individual members of an organization that carries the responsibility of making the modern city possible. Here is the romantic side of what has sometimes been considered a prosaic occupation. When each man from track cleaner to president is imbued with this conception of service and is determined to do his part in understanding the fundamentals of the relations which his company bears to the community, then indeed will the future of the local transportation industry be assured. When every employee understands the relation between the part he plays and the general job of carrying safely and efficiently the millions who daily use transportation service, the problems of public relations will be solved automatically. They must understand not only their part in this general scheme but they must be willing and ready to carry to their customers, both by word and by deed, this conception of their part in the complex structure of modern community life."

Public Service Orders More Gas-Electric Buses

Further replacement of its older buses by new vehicles is foreshadowed in the order recently placed by the Public Service Transportation Company, Newark, N. J., a subsidiary of the Public Service Railway, for 54 additional gas-electrics. This supplementary order increases from 333 to 387 the total number of gas-electric buses purchased by the railway from the Yellow Truck & Coach Manufacturing Company. Body work and painting on the first 200 is being done by the manufacturer, but the rest are being finished in the Plank Road Shops of the railway.

The first group of the new buses was placed in service on the Market line in Newark on April 21. Shortly after, service on the new Bergen Turnpike bus line was commenced with gas-electrics. Since then they have been put in operation also on other lines, proving very satisfactory and popular with the public. It is expected that the entire order will be completed within two or three months and all the buses in service.

Manufactures and the Markets

News of and for Manufacturers—Market and Trade Conditions
A Department Open to Railways and Manufacturers
for Discussion of Manufacturing and Sales Matters

Advantages of Modern Cars Re-emphasized

J. G. Brill Company, Philadelphia, Pa., has issued in booklet form the first reprint of a series of advertisements from the ELECTRIC RAILWAY JOURNAL emphasizing the advantages of modern cars, "the need of a great industry." The company is distributing 5,000 of these reprints to the railway industry and the members of the American Investment Bankers Association. With the series on modern cars and their displacement of obsolete equipment, the Brill company intends to keep alive the interest in this subject, which it thinks means increased riding and in the final analysis ability to pay dividends. This first reprint, leaflet No. 302, April, 1926, shows what can be done with modern equipment.

Freeman & Company to Finance Bus Purchases

Interests headed by Freeman & Company, New York, have announced plans for an organization to finance bus equipment trusts. The organization will be known as the National Transportation Lines Corporation.

The new corporation would simplify the legal procedure involved in bus financing, in that equipment trust certificates of such a vendor corporation would form a marketable security. Several equipment trust issues marketed in recent years had included buses with other collateral, and last fall a substantial issue of motor bus certificates entirely secured by buses and indorsed by the Chicago Motor Coach Company was sold by a group consisting of J. & W. Seligman & Company, G. M.-P. Murphy & Company and Freeman & Company.

The National Transportation Lines Corporation will be operated by Freeman & Company on lines similar to those of the National Steel Car Lines Company, which was formed by them in 1920 to finance purchases of tank cars, refrigerator cars and other special types of railroad equipment. For many years Freeman & Company have specialized in the sale of equipment trust obligations secured by pledge of steam railroad rolling stock.

Metal, Coal and Material Prices

Metals—New York	May 4, 1926
Copper, electrolytic, cents per lb	13.825
Copper wire, cents per lb	16.00
Lead, cents per lb	7.85
Zinc, cents per lb	7.12
Tin, Straits, cents per lb	63.25
Bituminous Coal, f.o.b. Mines	
Smokeless mine run, f.o.b. vessel, Hampton Roads, gross tons	$4.325
Somerset mine run, Boston, net tons	1.925
Pittsburgh mine run, Pittsburgh, net tons	1.95
Franklin, Ill., screenings, Chicago, net tons	1.825
Central, Ill., screenings, Chicago, net tons	1.575
Kansas screenings, Kansas City, net tons	2.50
Materials	
Rubber-covered wire, N. Y., No. 14, per 1,000 ft	$6.25
Weatherproof wire base, N.Y., cents per lb.	18.00
Cement, Chicago, net prices, without bags	2.10
Linseed oil (5-bbl. lots), N.Y., cents per lb.	11.30
White lead in oil (100-lb. keg), N. Y., cents per lb	15.00
Turpentine (bbl. lots), N. Y., per gal	$0.85

Specialties for Buses Covered in New Catalog

The Electric Service Supplies Company, Philadelphia, Pa., has issued Catalog No. 9, listing complete lines of equipment for buses. The manufacturer states that practically all of the material catalogued has been in service for at least two years. The equipment shown is rugged, in line with the need for substantial and failure-proof transportation units.

Some of the more important equipment listed in this catalog includes Hunter illuminated destination signs, Faraday passenger signal systems, Golden Glow headlamps, Keystone-Ivanhoe bus lighting fixtures, fare registers, signal keys, pull switches, door switches, ventilators, windshield cleaners, etc.

For the past twenty years the Electric Service Supplies Company has specialized in similar equipment for electric railway cars with great success.

Fifty Double-Deckers Ordered by Detroit from Fageol

Purchase of 50 double-deck, 60-passenger Fageol motor coaches by the Department of Street Railways at Detroit was approved by the Council on May 4. Delivery will begin within four months, under the terms of the bid offered by the Fageol company. This company, bidding under its own name, was the low bidder at the opening of the tenders on May 3 at D. S. R. headquarters. The Fageol price was $12,050 a bus, without tires.

It was originally planned to purchase 125 of these buses, but on examination of city finances it was found the city could pay cash by purchasing 50 buses at once.

Plans for the use of the coaches are being formulated by the Department of Street Railways, but the disposition of the coaches has not been decided, according to H. U. Wallace, general manager. G. Ogden Ellis, president of the Street Railway Commission, in announcing a few weeks ago the department's intentions to call for cash bids on 50 coaches, declared that the first of the coaches would be used to establish a Fourteenth Avenue line, from Chicago Boulevard south to West Grand Boulevard, thence over Holden Avenue to Cass Avenue and Second Boulevard to a point downtown.

Specifications drafted for the 50 buses were much the same as for the 125, bids on which had been asked before.

Extensive Bus Wheel Tests Being Made in Kansas City

Extensive tests on bus rear wheel combinations are being conducted by the Kansas City Railways, under the direction of R. W. Bailey, superintendent of power and equipment, and his assistant, F. C. Lynch. These tests are conducted in conjunction with representatives of many bus and equipment manufacturers who are interested.

The tests began April 23 and will probably last two weeks or more. They are open to all representatives of bus and equipment manufacturers. At the beginning of the second week of the test, 39 representatives of the leading bus and equipment manufacturers were represented.

In order to obtain basic data and information on the question of heat developed in regular operation, tests were made on several buses both of single and double deck type, taken out of regular operation. These buses were run in a specified manner over a test route of 2.8 miles per round trip. Two thermocouples were placed in each rear wheel, one between the tire bead and the rim and the other on the brake drum itself. Many combinations of tires and wheels of different types and sizes and different brakes and brake linings were tested. Careful records were kept of the several combinations and the results obtained. Tests were run until the temperature noted became constant. An electric potentiometer was placed in a small building at one end of the test run and readings were made at the end of each round trip.

These tests bid fair to give the industry important data that may result in the establishment of certain factors necessary to design a proper combination of wheel types and sizes, tires, drums, brakes and axles that will diminish certain difficulties that have developed.

Results of the tests will be assembled in a report after they have been completed. Data of interest to readers of the JOURNAL will be published in a future issue.

Thirteen equipment manufacturing companies in addition to the railway are participating in the tests.

Rolling Stock

Montreal Tramways, Montreal, Que., will obtain delivery in June of 50 one-man, two-man double-truck safety cars which were ordered from Canadian Car & Foundry Company in December, 1925, The cars are semi-steel in construction and have a seating capacity of 40. Principal specifications are given here:

Weights:	
Car body	15,200 lb.
Trucks	10,000 lb.
Equipment	8,800 lb.
Total	34,000 lb.
Bolster centers, length	17 ft. 7 in.
Length over all	41 ft. 2 in.
Truck wheelbase	5 ft. 4 in.
Width over all	8 ft. 3 in.
Height, rail to trolley base	10 ft. 10¼ in.
Body, wood	Semi-steel
Interior trim	Cherry
Headlining	Haskelite
Roof	Arch
Air brakes	Canadian Westinghouse
Armature bearings	Plain bronze, babbitt lined
Axles	4 in., 4½ in. gear seat
Bumpers	Hedley 4-rib
Bumpers	Hedley 4-rib anti-climber
Car signal system	Faraday
Car trimmings	Bronze
Center and side bearings	Cast steel, friction type
Compressors	Westinghouse DH-16
Control	K-35 XB with Westinghouse 806-L line switch
Couplers	Montreal Tramways standard
Curtain fixtures	National Lock Washer
Curtain material	Pantasote
Destination signs	Hunter
Door-operating mechanism	National Pneumatic
Fare boxes	Cleveland
Wheelguards	H-B
Gears and pinions	Nuttall, helical ratio 13-69
Hand brakes	Peacock staffless
Heater equipment	Thermostatic control, 45 cars Consolidated, 5 cars Railway Utility
Journal bearings	3½ in. x 7 in. standard
Journal boxes	Canadian Car & Foundry
Lightning arresters	Westinghouse MP
Motors	Four Westinghouse 510-A2, inside hung
Finish	Enamel
Sanders	Meissner's patent pneumatic
Sash fixtures	National Lock Washer
Seats	Ottawa Car Company
Seating material	Rattan
Slack adjuster	Westinghouse, Form E-1
Step treads	Kass
Trolley catchers	Keystone
Trolley base	Nuttall M-20
Trolley wheels	Ideal
Trucks	Canadian Car & Foundry
Ventilators	Railway Utility
Wheels	Cast iron, 26 in.
Special devices, etc.	Westinghouse variable load brake, Electric Service Supplies Company type K compensating lighting fixtures

Schenectady Railway, Schenectady, N. Y., has just received two Differential cars from the Differential Steel Car Company of Findlay, Ohio. These cars will be used principally for revenue purposes, such as hauling gravel for contractors.

Dallas Railway, Dallas, Tex., has just placed an order with the Differential Steel Car Company for a two-car Differential train. Each car will be equipped with G.E.-247 H motors and the control will be G.E. type M from one end.

Track and Line

Madison Railways, Madison, Wis., will rebuild and raise its track zone around the Capitol Square circle of four blocks in accordance with the city's new paving plans.

Key System Transit Company, Oakland, Cal., is planning to install new switches at Telegraph Avenue and Bancroft and at College Avenue and Dwight Way, in Berkeley, to provide a loop which would facilitate the handling of crowds for the University of California stadium. In addition the Spruce Street line would be extended Northward from Los Angeles Avenue to Regal Road.

New York, Westchester & Boston Railway, New York, N. Y., has awarded to Dwight F. Robinson & Company the contract for an extension of the New York, Westchester & Boston double-track electrically operated railway system from Mamaroneck to Hamilton, N. Y. Work on the construction of the extension will probably be begun immediately.

Los Angeles Railway, Los Angeles, Cal., will spend approximately $175,000 for its portion of the bridge and track changes on the Macy Street viaduct, opened on April 17.

Trade Notes

Ohio Brass Company, Mansfield, Ohio, moved its Chicago office on May 1 from 1217 to 1714 Fisher Building, 343 South Dearborn Street.

National Carbon Company, Inc., New York, N. Y., has taken over the plant inventory and good will of the Corliss Carbon Company. The combined National and Corliss lines now offer a complete assortment of brush grades to the market. A new finishing plant has been opened at Birmingham, Ala., to be used in supplying brushes throughout the Southern territory.

Cameron Electrical Manufacturing Company, Ansonia, Conn., manufacturer of commutators, announces the opening of a New York sales office in the Hudson Terminal Building, 50 Church Street, where in the future all inquiries or orders for its products will receive prompt and careful attention. The office will be under the management of E. G. Long Company, with which the Cameron company has been associated many years.

H. F. Darby, Jr., for more than twenty years with the Cutter Electrical & Manufacturing Company, Philadelphia, Pa., has resigned to organize a sales service for electrical and power machinery manufacturers. Mr. Darby states that he is about to visit manufacturing plants throughout the country and expects to establish headquarters in Philadelphia about June 1.

John T. Hogan was admitted to partnership in the firm of Parsons, Clapp, Brinckerhoff & Douglas, engineers, of New York, N. Y., on March 1, 1926. Mr. Hogan is a member of the American Society of Civil Engineers and was a director of that society from 1921 to 1923. He is also a member of the Society of American Military Engineers and served as lieutenant-colonel of engineers during the World War.

J. E. Rhodes, who has been identified with the electric railway industry for the last eighteen years and is a former official of the Irving S. Van Loan Corporation, has opened offices in the Times Building, New York City, under the name of the Electric Traction & Bus Company, to deal in high-class electric railway cars and equipment and to purchase entire railway properties.

New Advertising Literature

Armco Culver & Flume Manufacturers Association of Middletown, Ohio, has issued a pamphlet entitled "Increasing the Efficiency of Road Bed Drainage." The booklet provides a complete discussion of subdrainage with Armco perforated iron pipe, with particular reference to its advantages and application to railway work.

Reo Motor Car Company, Lansing, Mich., has issued a circular letter in which it lists the improvements which have been made in the third-year, model W, six-cylinder Reo bus. Among the points stressed are lower operating costs per mile, less time required for maintenance, easier operation, smoother running, additional energy available.



Especially adapted
to light-weight, safety cars—

Peacock Staffless Brakes

Though they have tremendous braking power, Peacock Staffless Brakes are light in weight, and require minimum platform space. These points make them especially adapted to use in modern light-weight cars that are so rapidly gaining favor throughout the electric railway industry.

Motormen like Peacock Staffless Breaks because of their simplicity, ruggedness and absolute dependability. Operators like them because of their low installation and maintenance costs. Available facts and figures bear out these statements.



The Peacock Staffless

Write for complete particulars

National Brake Co., Inc.

890 Ellicott Sq., Buffalo, N. Y.

Canadian Representative:

Lyman Tube & Supply Company, Limited, Montreal, Canada

Peacock Staffless Brakes

Bankers and Engineers

Ford, Bacon & Davis
Incorporated
Engineers
115 Broadway, New York
PHILADELPHIA CHICAGO SAN FRANCISCO

The J. G. White Engineering Corporation
Engineers—Constructors
Oil Refineries and Pipe Lines, Steam and Water Power Plants, Transmission Systems, Hotels, Apartments, Office and Industrial Buildings, Railroads.
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ELECTRIC RAILWAY ENGINEER
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REPORTS - APPRAISALS - RATES - OPERATION - SERVICE

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REPORTS ON
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111 W. Washington Street, Chicago, Ill.

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Consultant on Fares and Motor Buses
The Weekly and Sunday Pass—Differential Fares—Ride Selling
143 Crary Ave., Mt. Vernon, N. Y.

Transmission Line and Special Crossing Structures, Catenary Bridges
WRITE FOR OUR NEW DESCRIPTIVE CATALOG
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68 Trinity Place, New York
CHICAGO ST. LOUIS

JAMES E. ALLISON & CO.
Consulting Engineers
Specializing in Utility Rate Cases and Reports to Bankers and Investors
1017 Olive St., St. Louis, Mo.

J. ROWLAND BIBBINS
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TRANSPORTATION SURVEYS
Organized Traffic Relief and Transit Development
Co-ordinating Motor Transport, Railroad and City Plans, Service, Routing, Valuation, Economic Studies
EXPERIENCE IN 20 CITIES

THE P. EDWARD WISH SERVICE
50 Church St. NEW YORK — *Street Railway Inspection* DETECTIVES — 131 State St. BOSTON

When writing the advertiser for information or prices, a mention of the Electric Railway Journal would be appreciated.

NAUGLE POLES
WESTERN & NORTHERN CEDAR
NAUGLE POLE & TIE CO.
59 E. MADISON ST. CHICAGO ILL.
New York · Columbus · Kansas City · Spokane · Vancouver · Boston

ROEBLING
WELDING CABLE
ELECTRICAL WIRES and CABLES
John A. Roebling's Sons Company, Trenton, N. J.

A Single Segment or a Complete Commutator
is turned out with equal care in our shops. The orders we fill differ only in magnitude; small orders command out utmost care and skill just as do large orders. CAMERON quality applies to every coil or segment that we can make, as well as to every commutator we built. That's why so many electric railway men rely absolutely on our name.
Cameron Electrical Mfg. Co., Ansonia, Connecticut

BRAZED **Rail Bonds** ARC WELD
Portable Arc Welding Outfits
The Electric Railway Improvement Co.
Cleveland, Ohio

Northern **CEDAR POLES** Western
We guarantee
all grades of poles; also any butt-treating specifications
BELL LUMBER COMPANY
Minneapolis, Minn.

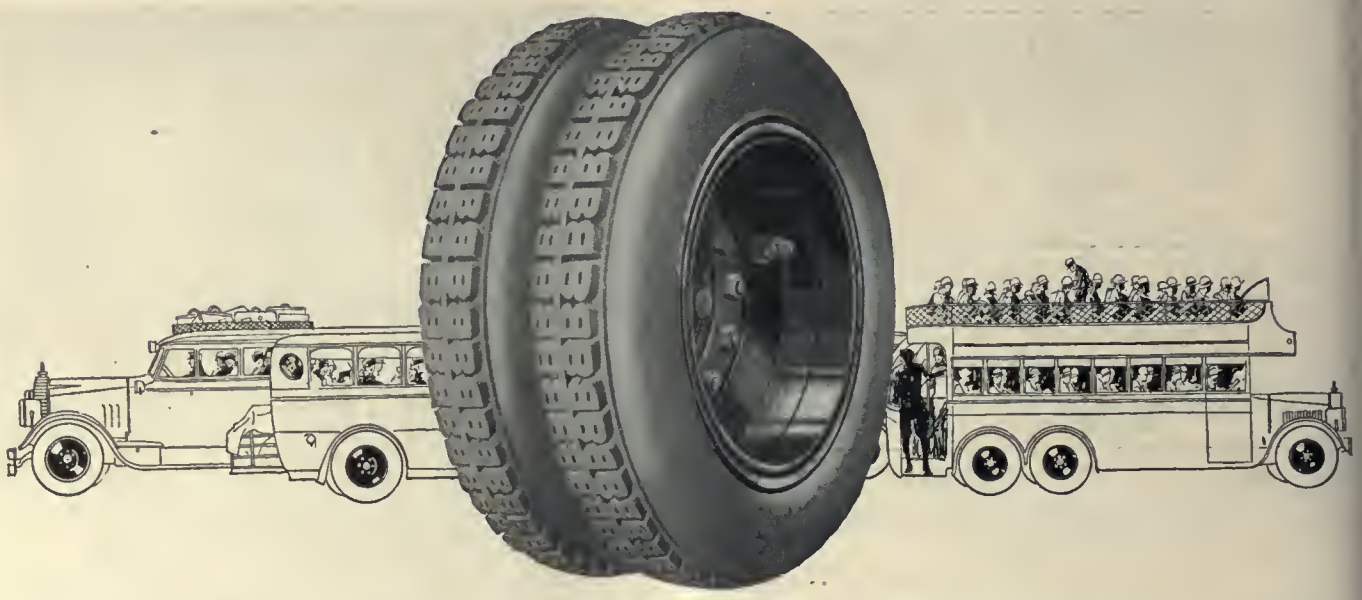




MOHAWKS
Go Farther!

Mohawk volume is doubling yearly. Only results—mileage results—create such popularity. Your Mohawk dealer can prove that these tires actually go farther—from five to ten thousand miles more than the accepted standards of mileage.

THE MOHAWK RUBBER COMPANY
AKRON, OHIO
Branches in Principal Cities
Export Dept: 245 West 55th Street, New York, N. Y.



Budd-Michelin Dual Wheels

are the silent ambassadors to greater profits

YOU'LL see them wherever heavy buses travel. You'll find them whirling out long, profitable miles under giant buses on all kinds of roads. You'll find Budd-Michelin Dual Wheels on every bus.

That's about the highest indorsement any wheel can have — and Budd-Michelin Duals have it! They have grown up with the bus industry. They made it possible for heavy buses to ride on *regular size* pneumatics. They solved the problem of getting lower body suspension without sacrificing seating capacity.

Veteran bus owners have put their fleets on Budd-Michelin Dual Wheels. They know by their check stubs when they're getting their money's worth. They know the economy of one-size wheels, one-size tires, one wheel-service for the entire fleet. And they're rolling up 15,000 to 20,000 miles and more on a set of tires.

You can't beat actual service as a test of merit. Over 40,000 heavy buses are keeping their operating costs down to bed-rock with Budd-Michelin Dual Wheels. It doesn't pay to take the detours of experiment. Not when the way is paved with proved performance.



BUDD
WHEEL COMPANY
Detroit

The Budd-Michelin equipment—two Budd-Michelin single wheels in front, two Budd-Michelin Dual Wheels in the rear (pairs of single wheels acting together as units.) All wheels completely interchangeable either as units or as halves of Duals. One spare.

The G-Boy

GRAHAM BROTHERS *New* ONE TON TRUCK

Graham Brothers latest and most impressive achievement—the G-BOY!

A one ton truck embodying entirely new ideas in design and balance and selling at an astonishing price.

Extraordinary purchasing power and vast production made the G-BOY possible.

Largest exclusive truck manufacturers in the world, Graham Brothers buy and build in enormous volume.

The price and quality of the G-BOY illustrate the extent to which buyers benefit by this volume and its resultant economies.

The G-BOY is the most important contribution in years to the cause of *Better Transportation at Lower Cost.*

A new system of weight distribution effects a revolutionary improvement in balance.

The compact wheelbase facilitates ease of handling and yet affords unusually generous body capacity. The truck is gracefully low, with steel spoke wheels and 30 x 5 truck type cord tires.

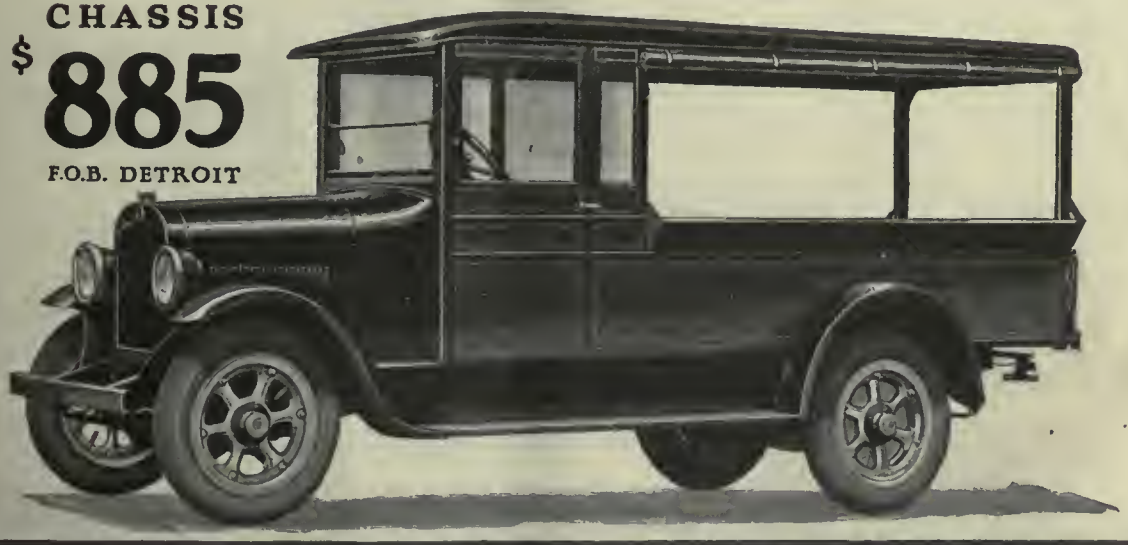
Dodge Brothers engine is the standard power unit, with a new heavy transmission that has proved its quality in greater capacity types.

The entire truck, in fact, is built to outlive and outperform trucks costing hundreds of dollars more.

Bodies for the G-BOY—and for Graham Brothers complete line of Trucks and Motor Coaches—are built in Graham Brothers own factory at Evansville, Ind. —the most modern plant of its kind in America. Whatever your requirements may be, a suitable body is immediately available at an attractive price.

GRAHAM BROTHERS
Evansville – DETROIT – Stockton
A DIVISION OF DODGE BROTHERS, INC
GRAHAM BROTHERS (CANADA) LIMITED – TORONTO, ONTARIO

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$885
F.O.B. DETROIT



SOLD BY DODGE BROTHERS DEALERS EVERYWHERE

FISK TRANSPORTATION *"Fillerless"* CORDS



Time to Re-tire Get a Fisk
Trade Mark Reg. U. S. Pat. Off.

Tires that run big mileages under exacting conditions. They add safety in operation and help keep down running expenses thru their consistent reliability on the road.

From Maine to California they have proved their value to the big bus operators.

Fisk Transportation "Fillerless" Cords are made in all bus and truck sizes.

The Fisk Tire Company, Inc.
Chicopee Falls, Mass.

The Beautiful Coaches of INTERNATIONAL HARVESTER *Manufacture Lend Distinction to the Proudest Highways*

THE success of the International Harvester Company in motor coach development is founded on the firm foundation of over twenty years' automotive experience.

Merit in design and mechanical detail, beauty of line, and perfection of body appointment have built a consistent high reputation for International Motor Coaches and called them to service on good and bad roadways the nation over.

The various bodies supplied for the 6-cylinder chassis carry 24 to 33 passengers. Regular equipment includes air brakes on all four wheels. The International SL 4-cylinder coach (12 to 14-passenger) offers extra advantages of flexibility and economy, either as main units for many requirements or as auxiliaries to larger enterprises. Write the Chicago address for special information.

INTERNATIONAL offers unparalleled service to coach owners, rendeted through the *world's largest Company-owned truck and coach service organization.* Company-owned branches now at 120 points in the United States and 17 in Canada, supplemented by the service of our automotive dealers.

INTERNATIONAL HARVESTER COMPANY
606 So. Michigan Ave. of America (Incorporated) Chicago, Illinois

A fleet of 37: International Harvester Coach, Davis Shores, St. Augustine, Fla. One of a popular fleet of 37 International 6-cylinder parlor coaches being operated throughout Florida by the Blue Bus Line of Tampa



"To promote public popularity"

Announcing Baker Raulang BUS BODIES

THE Baker-Raulang Company announces that it has enlarged its service to include a Bus Body Division.

To this new product The Baker-Raulang Company brings:

—67 years' uninterrupted experience in the body-builder's art

—a personnel trained to the habit of building the finest grades of bodies ever maintained on a production basis and including experienced and specialized bus body engineers

—a creative leadership responsible for continuous contributions to automobile progress, including the *closed body itself*

—a designing and manufacturing program established on the conviction that the greatest service which can be rendered Bus Transportation today lies in the development of bodies which will materially advance the passenger's comfort and convenience and build up revenue by achieving a wider popularity for this form of transportation.



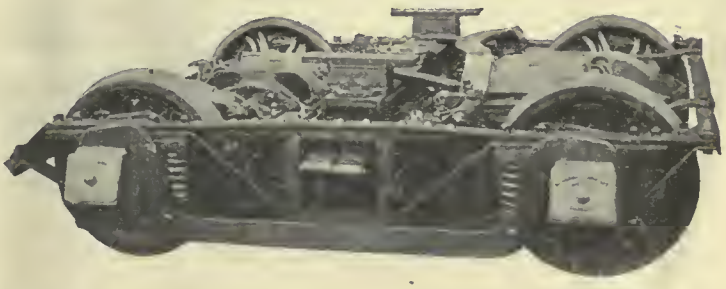
The first body-types produced by this new department give in tangible form ample and convincing proof of ability to make our busses make good under our slogan to "*promote public popularity*".

THE BAKER-RAULANG COMPANY
Bus Body Division CLEVELAND



Modern Cars

TWENTY-FIVE YEARS experience in building fine cars, and twenty-five years' continual contact with the needs of progressive railways enables this company to meet every need of today's conditions. Our engineering department will co-operate with you in working out designs and submitting proposals, or we will gladly quote on your plans and specifications.



MC62 Light weight truck for low car bodies, city or interurban service. Inside hung equalizer bars.

CUMMINGS CAR AND COACH COMPANY

Successor to McGuire Cummings Mfg. Co.

111 W. Monroe Street
CHICAGO

Keep ahead of the other traffic



It has been truly said that "the lagging trolley gathers no velvet."

Too long have the street cars been bedeviled by the ubiquitous taxi and the itinerant jitney bus. Speedier than the old-fashioned trolley, these guerrillas shoot ahead and pick up the more important fares waiting at every white post.

can be done with faster cars!

It's no longer necessary to let the street cars be the followers. They can be leaders in the race of street traffic.

What the railways need is faster cars, cars with higher accelerating and braking rates. They need cars which "get away" like a scared rabbit on the go-ahead signal. They need cars with such powerful, yet smoothly holding brakes, that they'll come to rest without a jerk, in three or four times their own length. They need cars with free running speeds at least equal to the maximum permitted other vehicles on the public streets.

With such cars, there'll be no more "cutting-in" by reckless drivers, to get ahead between the stops.

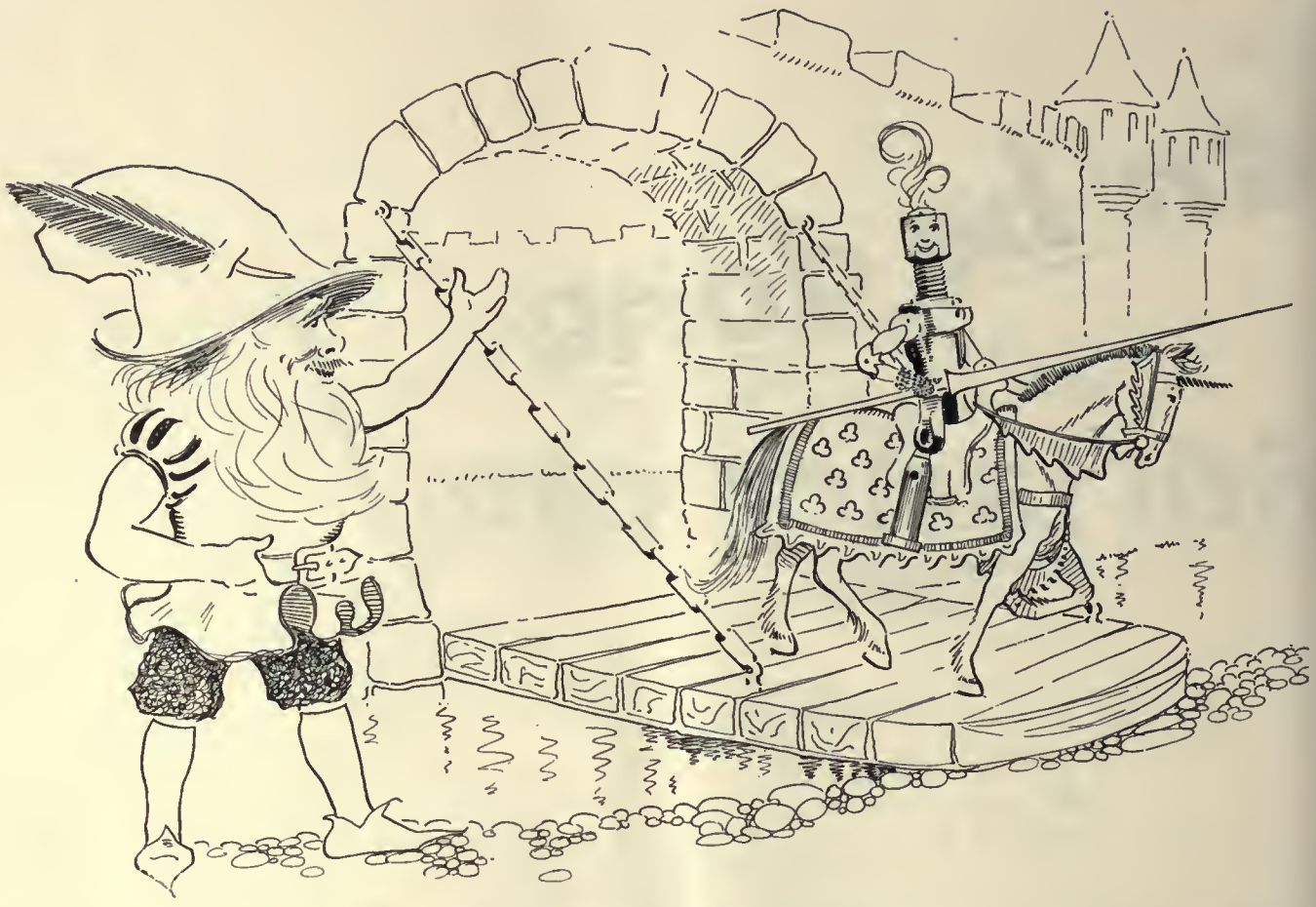
With such cars, there'll be no more jumping ahead of taxis at every crossing.

Let the other street traffic follow your cars for a change, instead of racing ahead. It's a more pleasing thing to the passengers to see themselves riding in the vanguard instead of the rear guard. And it has a salutary effect on the private automobile driver and encourages him to try the cars again.

New cars—and faster ones—will do it! They are doing it now on several modernized properties.

THE J. G. BRILL COMPANY
PHILADELPHIA, PA.
AMERICAN CAR CO. ST. LOUIS MO. — G.C. KUHLMAN CAR CO. CLEVELAND, OHIO. — WASON MANF'G CO. SPRINGFIELD, MASS.





Positive Protection!



"Boyerize to Economize"

When the knight rode forth to battle in ancient times he was fully protected from head to foot by heavy armor which the enemy could not pierce.

When a Boyerized Part goes into service in modern days it is completely protected from end to end by our Boyerizing Process which the "wear-and-tears" cannot penetrate.

Because of this treatment Boyerized Parts easily outlast ordinary steel parts three to four times. Which means that to standardize on these parts is to economize on maintenance costs.

Ask for quotations on your requirements.

Brake Pins
Brake Hangers
Brake Levers
Pedestal Gibs
Brake Fulcrums
Center Bearings
Side Bearings
Spring Post Bushings
Spring Posts
Bolster and Transom Chafing Plates
Manganese Brake Heads
Manganese Truck Parts
Bushings
Bronze Bearings

Bemis Car Truck Company

Electric Railway Supplies

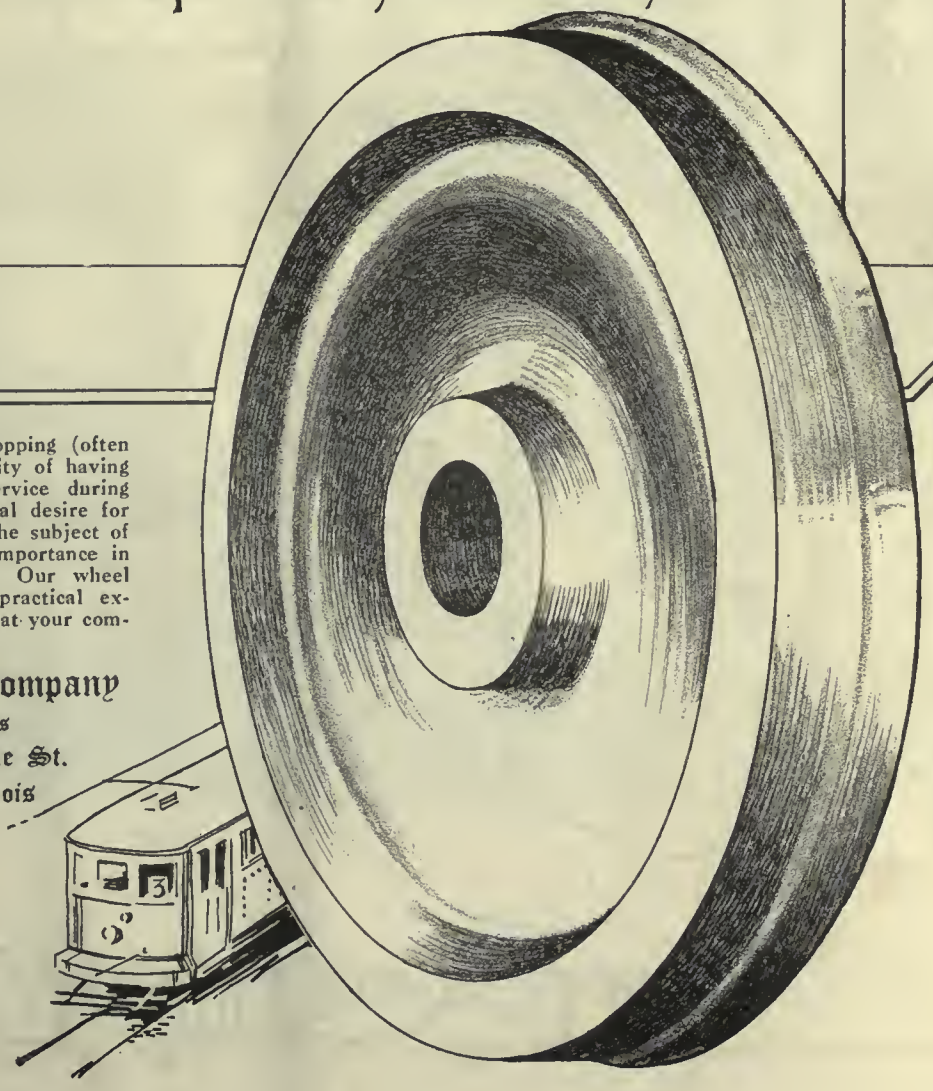
Springfield, Mass.

Representatives:

Economy Electric Devices Co., Old Colony Bldg., Chicago, Ill.
F. F. Bodler, 903 Monadnock Bldg., San Francisco, Cal.
W. F. McKenney, 54 First Street, Portland, Ore.
J. H. Denton, 1328 Broadway, New York City, N. Y.
A. W. Arlin, 772 Pacific Electric Bldg., Los Angeles, Cal.

In the final analysis, the success of a wheel in electric railway service is governed by the manner in which it measures up to three requirements: [1] Safety [2] Dependability [3] Economical Mileage Cost.

Gary Wheels, being *homogeneous* in nature, *wrought steel* in construction and of the *multiplied mileage* type, meet these essentials in a particularly effective way.



Frequent starting, quick stopping (often in emergencies), the necessity of having maximum equipment in service during rush periods, and the natural desire for low operating costs, make the subject of Wheels one of particular importance in the electric railway field. Our wheel specialists, with years of practical experience to guide them, are at your command.

Illinois Steel Company
General Offices
208 So. La Salle St.
Chicago, Illinois

MODERN CARS *for* Coral Gables,

Florida's outstanding real estate development, and most modern city, has attracted world-wide attention because of its size, magnificence and the complete way in which the plans have been executed.







Coral Gables realized the necessity of modern transportation to any community, and organized the Coral Gables Rapid Transit Corporation, which built a railway from Miami to Coral Gables and into the newly developed area. The establishment of this line emphasizes the permanent character of the development and the stability of the project, and testifies to the vision and sound judgment of the executives.



Quality Cars

a MODERN CITY



These Deluxe cars, built in the Quality Shops of the St. Louis Car Co., recently delivered to Coral Gables, are noteworthy examples of the modern electric car. The brief specifications below give an idea of the characteristics of these cars. And the photographs reproduced herewith indicate their luxurious appearance.

Length over all	47 ft. 8 in.
Width over all	8 ft. 3-3/26 in.
Seating capacity	52
Aisle width	2 ft. 1 in.
Platform length	5 ft. 6 in.
Seat spacing	2 ft. 6 in.

Trucks: St. Louis C. M. 69 with 26 in. rolled steel wheels, 3¾x7 Journals. Quadruple 40 h.p. motors. Pneumatic sliding doors. Seats upholstered in genuine brown Spanish leather. Inlaid rubber floor tiles. Special lighting. Interior trim finished in walnut. Porcelain stanchions, aluminum fittings. Exterior color is coral.

St. Louis Car Company

St. Louis, Mo.

"The Birthplace of the Safety Car"

The Enemies of your pavement and road-bed—

Water seeping thru to ties and cross-rods	**Heat** compelling expansion that ruins rigid surfaces	**Cold** with the irresistible upward thrust of freezing	**Snow** forcing traffic to the center of street	**Chains** hungrily gnawing at your pave-ment's surface	**Impact** of your own cars as well as heavy trucks	**Age** the deadly foe of many paving materials

—are all baffled by the 6-point service of vitrified brick pavements

Only one pavement—at reasonable first cost—meets the particular requirements of electric railway use—vitrified brick, asphalt-filled.

And the 6 reasons for this are that vitrified brick pavements, asphalt-filled (1) absorb impact at rail joints; (2) water-seal road-bed and ties; (3) allow for contraction and expansion; (4) resist heaviest traffic; (5) are easily removable; (6) have practically 100% salvage value.

6 point service

VITRIFIED Brick PAVEMENTS

OUTLAST THE BONDS

NATIONAL PAVING BRICK MANUFACTURERS ASSOCIATION, ENGINEERS BLDG., CLEVELAND, OHIO

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Alton, Ill.
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Bethlehem Track Specialties



Railbound Manganese Hard Center Frog, Design 951.



Railbound Manganese Hard Center Switch, Design 909.

Railbound Hard Center Mate, Design 526.

BETHLEHEM manufactures a complete line of Electric Railway track specialties.

The three illustrated products are of the railbound hard center type, and are made to withstand extreme traffic conditions. The manganese steel centers are accurately ground to fit the rail. The parts of the frog, switch and mate are bolted together with heat-treated Mayari chrome-nickel bolts.

Bethlehem track specialties are widely used by Electric Railways because of their efficiency, economy and durability.

Bethlehem Products for Electric Railways

Tee and Girder Rails; Machine Fitted Joints; Splice Bars; Hard Center Frogs; Hard Center Mates; Rolled Alloy Steel Crossings; Abbott and Center Rib Base Plates; Rolled Steel Wheels and Forged Axles; Tie Rods; Bolts; Tie Plates and Pole Line Material.

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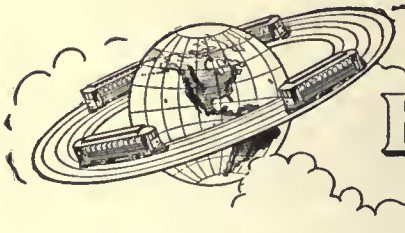
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Bethlehem Steel Export Corporation, 25 Broadway, New York City, Sole Exporter of our Commercial Products

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IT'S no paradox that overhead costs are low when a telephone or signal line is laid underground. Bermico Fibre Conduit is proving that every day.

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Nuttall Helical Gears for—
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All Nuttall BP Gears for four times the service life of untreated gears.

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R. D. NUTTALL COMPANY
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is a native beer that the Kaffir drinks at the 48-hour bridal dance.

It is NOT intoxicating.

You couldn't keep up such steady performance on anything intoxicating.

Even an electrical machine can't keep going on brushes that have a kick in them.

That's why operators turn to Morganite brushes to cut out sparking and squealing and other noises which indicate intoxicated commutation.

If you want kick—get it from a *boot*-legger.

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Electric Railway Directory

Because:—

All purchases are passed upon by two and often three officials before the order is placed. If your salesmen are not procuring orders they are not interviewing the proper officials.

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It is too expensive to have your literature go wrong. In fact the directory pays for itself many times over the first campaign.

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1—Complete list of every recorded electric railway company in the United States, Canada, Mexico, and the West Indies.

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4—Addresses of bus repair shops.

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6—Number and kinds of cars used.

7—Rates of fare.

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E.R.J. 5-8-26

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USE LE CARBONE CARBON BRUSHES

They talk for themselves

COST MORE PER BRUSH
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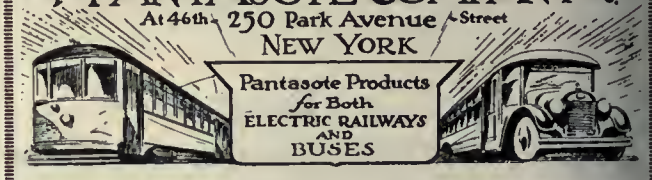
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standard
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More-Jones "Tiger" Bronze castings for axle and armature-bearing service was one of our early achievements. This is probably the most widely known bronze on the market. It has stood the test of time. There is nothing better for long, efficient and most economical results. Let us quote you.

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THERE'S permanent in-built accident insurance in every one of these all-steel safety car steps. Moreover, there is comfort for passengers—a secure, slip-proof foot hold in all weather that speeds up passenger interchange. One damage suit may cost you more than a complete equipment of "SAFKAR" Steps for your system. *Have you Catalog 4A28?*

IRVING IRON WORKS CO.
LONG ISLAND CITY, N.Y. U.S.A.

P-83

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That's why 85% of the Electric Railway Lines buy "Tool Steel" gears and pinions.

The Tool Steel Gear & Pinion Co.
Cincinnati, Ohio



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GEARS AND PINIONS



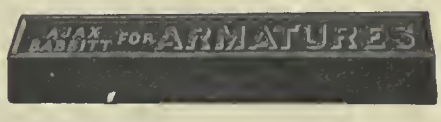
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Not if you use

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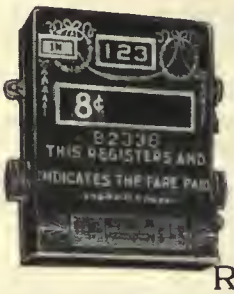


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Established 1880
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Ohmer Fare Register Company
Dayton, Ohio



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DIXON'S ALUMINUM-GRAPHITE PAINT

Prepared primarily to meet the requirements of gas, oil and industrial companies and particularly recommended wherever a light colored paint is desired.

Back of this new product stands our century-old reputation, as well as 65 years' experience in paint manufacturing.

Dixon's Aluminum Graphite Paint is composed of aluminum and flake silica-graphite as a pigment and boiled linseed oil as a vehicle. The aluminum is of flake formation and thus easily combines with the flake graphite, lapping over like fish scales and providing a covering of unusual elasticity and durability.

The value of flake-graphite as a pigment has been thoroughly proven and is generally accepted. The combination of aluminum and graphite results in a paint that is not affected by gases, fumes, and which resists sunlight, air and moisture. Reflecting light and heat, it will keep the temperature of tanks, etc., considerably lower than is possible with darker paints.

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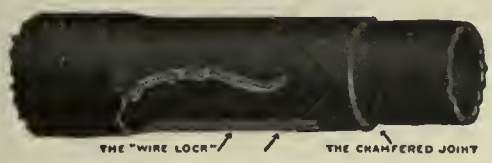
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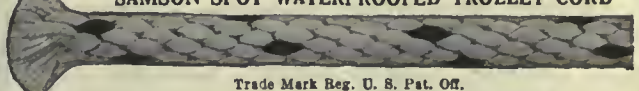
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HASKELITE MANUFACTURING CORPORATION
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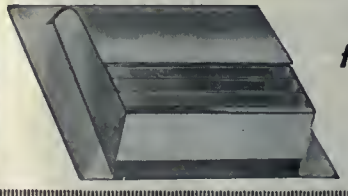
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are two of the winter problems that you must settle without delay. We can show you how to take care of both, with one equipment. Now is the time to get your cars ready for next winter. Write for details.
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For Locomotives, Passenger, Freight and Electric Cars
Smooth Forged or Rough Turned—Carbon or Alloy Steel—Plain or Heat Treated, Forged and Turned Piston Rods, Crank Pins, Large Shafts, Round Bars, etc.

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682


N-L Ventilators
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G-3

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1—500 kw., 600-v., 833 amp., 900 r.p.m., 6-ph., compound wound Westinghouse Rotary Converter, with 3—165 kva., 60-cy., single ph., 13200 v. primary transformers with A.C. and D.C. panels.

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ELECTRIC RAILWAY CARS & EQUIPMENT

We solicit your inquiries and offerings.

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30 Birney Safety Cars

Brill Built

West. 508 or G. E. 264 Motors. Cars Complete—Low Price—Fine Condition.

ELECTRIC EQUIPMENT CO.
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WHAT AND WHERE TO BUY

Equipment, Apparatus and Supplies Used by the Electric Railway Industry with Names of Manufacturers and Distributors Advertising in this Issue

Advertising, Street Car
Collier, Inc., Barron G.

Air Brakes
Christensen Air Brake Co.
Westinghouse Air Brake Co.

Air Receivers & Aftercoolers
Ingersoll-Rand Co.

Anchors, Guy
Elec. Service Supplies Co.
Graybar Electric Co.
Ohio Brass Co.
Westinghouse E. & M. Co.

Armature Shop Tools
Elec. Service Supplies Co.

Automatic Return Switch Stands
Ramapo Ajax Corp.

Automatic Safety Switch Stands
Ramapo Ajax Corp.

Axles
Bemis Car Truck Co.
Bethlehem Steel Co.
Brill Co., The J. G.
Carnegie Steel Co.
Illinois Steel Co.
Johnson & Co., J. R.
National Ry. Appliance Co.
St. Louis Car Co.
Westinghouse E. & M. Co.

Axles, Carbon Vanadium
Johnson & Co., J. R.

Axles, Steel
Bethlehem Steel Co.
Carnegie Steel Co
Johnson & Co., J. R.

Babbit Metal
Ajax Metal Co.
Johnson & Co., J. R.
More-Jones Brass & Metal Co.

Badges and Buttons
Elec. Service Supplies Co.
International Register Co.

Batteries, Dry
National Carbon Co.
Nichols Lintern Co.

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Ajax Metal Co.
Bemis Car Truck Co.
Brill Co., The, J. G.
General Electric Co.
More-Jones Brass & Metal Co.
St Louis Car Co.
Westinghouse E. & M. Co.

Bearings, Center and Roller Side
Stucki Co., A.

Bells & Buzzers
Consolidated Car Heating Co.

Bells and Gongs
Brill Co., The J. G.
Elec. Service Supplies Co.
Graybar Electric Co.
St. Louis Car Co.

Benders, Rail
Railway Trackwork Co.

Bodies, Bus
Baker-Raulang Co., The
Cummings Car & Coach Co.
Graham Bros.

Bodies, Passenger Car
Baker-Raulang Co., The

Body Material, Haskelite and Plymetl
Haskelite Mfg. Corp.

Boilers
Babcock & Wilcox Co.

Bolts & Nuts Track
Illinois Steel Co.

Bond Testers
American Steel & Wire Co.
Electric Service Supplies Co.

Bonding Apparatus
American Steel & Wire Co.
Electric Railway Improvement Co.
Elec. Service Supplies Co.
Graybar Electric Co.
Ohio Brass Co.
Railway Trackwork Co.
Una Welding & Bonding Co.

Bonds, Rail
Amer. Steel & Wire Co.
Electric Railway Improvement Co.
Elec. Service Supplies Co.
General Electric Co.
Ohio Brass Co.
Railway Trackwork Co.
Una Welding & Bonding Co.
Westinghouse E. & M. Co.

Brackets and Cross Arms (See also Poles, Ties, Posts, Etc.)
Bates Expanded Steel Truss Co.
Elec. Ry. Equipment Co.
Elec. Service Supplies Co.
Graybar Electric Co.
Hubbard & Co.
Ohio Brass Co.

Brake Adjusters
Brill Co., The J. G.
National Ry. Appliance Co.
Westinghouse Tr. Br. Co.

Brake Shoes
Bemis Car Truck Co.
Brill Co., The J. G.
St. Louis Car Co.

Brakes, Brake Systems and Brake Parts
Bemis Car Truck Co.
Brill Co., The J. G.
General Electric Co.
National Brake Co.
Safety Car Devices Co.
St. Louis Car Co.
Westinghouse Tr. Br. Co.

Brick, Paving
National Paving Brick Mfrs. Assn.

Brick, Vitrified
National Paving Brick Mfrs. Assn.

Brushes, Carbon
General Electric Co.
Jeandron, W. J.
Le Carbone Co.
Morganite Brush Co., Inc.
National Carbon Co.
Westinghouse E. & M. Co.

Brushes Graphite
Morganite Brush Co., Inc.
National Carbon Co.

Brushes, Metal Graphite
National Carbon Co.

Brushes, Wire Pneumatic
Ingersoll-Rand Co.

Bulkheads
Haskelite Mfg. Corp.

Bus Seats
Hale-Kilburn Co.

Buses, Motor
Brill Co., The J. G.
Cummings Car & Coach Co.
Graham Brothers
International Harvester Co.
International Motor Co.
Mack Trucks, Inc.
St. Louis Car Co.
Yellow Truck & Coach Manuf. Co.

Bushings, Case Hardened and Manganese
Bemis Car Truck Co.
Brill Co., The J. G.
St. Louis Car Co.

Cables. (See Wires and Cables)

Cambric Tapes, Yellow and Black Varnish
Irvington Varnish & Ins. Co.

Carbon Brushes (See Brushes, Carbon)

Carbon Paste, Welding
National Carbon Co.

Carbon Plates, Welding
National Carbon Co.

Carbon Rods, Welding
National Carbon Co.

Car Lighting Fixtures
Elec. Service Supplies Co.

Car Panel Safety Switches
Consolidated Car Heat. Co.
Westinghouse E. & M. Co.

Car Steps, Safety
Irving Iron Works

Car Wheels, Rolled Steel
Bethlehem Steel Co.

Cars, Dump
Brill Co., The, J. G.
Differential Steel Car Co.
St. Louis Car Co.

Cars, Gas, Rail
Brill Co., The, J. G.
St. Louis Car Co.

Cars, Passenger, Freight, Express, etc.
American Car Co.
Brill Co., The J. G.
Cummings Car & Coach Co.
Kuhlman Car Co., G. C.
National Ry. Appliance Co.
St. Louis Car Co.
Wason Mfg. Co.

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Electric Equipment Co.

Cars, Self-Propelled
Brill Co., The, J. G.
General Electric Co.

Castings, Brass Composition or Copper
Ajax Metal Co.
More-Jones Brass & Metal Co.

Castings, Gray Iron and Steel
American Steel Foundries
Bemis Car Truck Co.
St. Louis Car Co.
Wm. Wharton, Jr. & Co.

Castings, Malleable and Brass
Bemis Car Truck Co.
St. Louis Car Co.

Catchers and Retrievers, Trolley
Elec. Service Supplies Co.
Ohio Brass Co
Wood Co., Chas. N.

Catenary Construction
Archbold-Brady Co
Graybar Electric Co.

Ceiling Car
Haskelite Mfg. Corp.
Pantasote Co., Inc.

Ceilings, Plywood, Panels
Haskelite Mfg. Co.

Change Carriers
Cleveland Fare Box Co.
Electric Service Supplies Co

Circuit-Breakers
General Electric Co.
Westinghouse E. & M. Co.

Clamps and Connectors for Wires and Cables
Elec. Ry. Equipment Co.
Elec. Ry. Improvement Co.
Elec. Service Supplies Co.
General Electric Co.
Hubbard & Co.
Ohio Brass Co.
Westinghouse E. & M. Co.

Cleaners and Scrapers Track (See also Snow-Plows, Sweepers and Brooms)
Brill Co., The J. G.
Ohio Brass Co.
Root Spring Scraper Co.
St. Louis Car Co.

Clusters and Sockets
General Electric Co.

Coil Banding and Winding Machines
Elec. Service Supplies Co.
Westinghouse E. & M. Co.

Coils, Armature and Field
General Electric Co.
Westinghouse E. & M. Co.

Coils, Choke and Kicking
Elec. Service Supplies Co.
General Electric Co.
Westinghouse E. & M. Co.

Coin Counting Machines
Cleveland Fare Box Co
International Register Co.

Coin Sorting Machines
Cleveland Fare Box Co.

Coin Wrappers
Cleveland Fare Box Co.

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Elec. Service Supplies Co.
General Electric Co.
Westinghouse E. & M. Co.
Wood Co., Chas. N.

Commutator Truing Devices
General Electric Co.

Commutators or Parts
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General Electric Co.
Westinghouse E. & M. Co.

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General Electric Co.
Graybar Electric Co.
Ingersoll-Rand Co.
Westinghouse Tr. Br. Co.

Compressors, Air, Portable
Ingersoll-Rand Co.

Condensers
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Ingersoll-Rand Co.
Westinghouse E. & M. Co.

Condensor Papers
Irvington Varnish & Ins. Co.

Connectors, Solderless
Westinghouse E. & M. Co.

Connectors, Trailer Car
Consolidated Car Heat. Co.
Elec. Service Supplies Co.
Ohio Brass Co.

Controllers
American Brown Boveri Elec. Corp.

Controllers or Parts
General Electric Co.
Westinghouse E. & M. Co.

Controller Regulators
Elec. Service Supplies Co.

Controlling Systems
General Electric Co.
Westinghouse E. & M. Co.

Converters, Rotary
American Brown Boveri Elec. Corp.
General Electric Co.
Westinghouse E. & M. Co.

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American Brass Co.
Anaconda Copper Mining Co.

Copper Wire Instruments, Measuring, Testing and Recording
American Brass Co.
American Steel & Wire Co
Anaconda Copper Mining Co.

Cord, Bell, Trolley, Register
Brill Co., The J. G
Elec. Service Supplies Co.
International Register Co.
Roebling's Sons Co., John A
St. Louis Car Co.
Samson Cordage Works
Silver Lake Co.

Cord Connectors and Couplers
Elec. Service Supplies Co.
Samson Cordage Works
Wood Co., Chas. N.

Couplers, Car
American Steel Foundries
Brill Co., The J. G.
Ohio Brass Co.
St. Louis Car Co.
Westinghouse Tr. Br. Co.

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Electric Service Supplies Co.

Crossing Foundations
International Steel Tie Co.

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Ramapo Ajax Corp.
Wm. Wharton, Jr. & Co.

Crossings, Frogs & Switches
Ramapo Ajax Corp.
Wm. Wharton, Jr & Co.

Crossings, Manganese
Bethlehem Steel Co.
Ramapo Ajax Corp.
Wm. Wharton, Jr. & Co.

Crossings, Track (See Track) Special Work)

Crossings, Trolley
Ohio Brass Co.
Westinghouse E. & M. Co.

Curtains & Curtain Fixtures
Brill Co., The J. G.
Morton Mfg. Co.
Pantasote Co., Inc.
St. Louis Car Co.

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East St. Louis & Sub. Ry. Co.
Elec. Equipment Co
Electric Traction and Bus Co.
Hyman Michaels Co.
Sachsenmaier Co., George
Salzberg Co., Inc., H. E.

Dealer Second Hand Rails
Hyman Michaels Co.

Derailing Devices (See also Track Work)

Derailing Switches
Ramapo Ajax Corp.

Destination Signs
Elec. Service Supplies Co.

Detective Service
Wish-Service, P. Edward

Door Operating Devices
Brill Co., The J. G.
Consolidated Car Heating Co.
Nat'l Pneumatic Co., Inc.
Safety Car Devices Co.

Doors & Door Fixtures
Brill Co., The J. G.
General Electric Co.
Hale-Kilburn Co.
Morton Mfg. Co
St. Louis Car Co.

Doors, Folding Vestibule
Nat'l Pneumatic Co., Inc.
Safety Car Devices Co.

Drills, Track
Amer. Steel & Wire Co.
Electric Service Supplies Co.
Ingersoll-Rand Co.
Ohio Brass Co.

Dryers, Sand
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Ohio Brass Co.
Westinghouse E. & M. Co.

Ears
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Ohio Brass Co.
Westinghouse E. & M. Co.

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Graybar Electric Co.
Railway Track-work Co.

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Amer. Steel & Wire Co.
Graybar Electric Co.
John A. Roebling's Sons Co.

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Railway Trackwork Co.
Una Welding & Bonding Co.

Electrodes, Steel
Railway Trackwork Co.
Una Welding & Bonding Co.

Engineers, Consulting, Contracting and Operating
Allison & Co., J. S.
Archbold-Brady Co.
Beeler, John A.
Bibbins, Rowland J.
Buchanan & Layng Corp.
Day & Zimmermann, Inc.
Ford, Bacon & Davis
Hemphill & Wells
Holst, Engelhardt W.
Jackson, Walter
Kelker & DeLeuw
Kelly Cooke & Co.
McClellan & Junkersfeld
Richey, Albert S.
Sanderson & Porter
Stevens & Wood
Stone & Webster
White Eng. Corp., The J. G.

Engines, Gas, Oil or Steam
Ingersoll-Rand Co.
Westinghouse E. & M. Co.

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Cleveland Fare Box Co
Ohmer Fare Register Co.
Perey Mfg. Co.
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Fare Registers
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Ohmer Fare Register Co.

Fences, Woven Wire and Fence Posts
Amer. Steel & Wire Co.

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Consolidated Car Fender Co.
Root Spring Scraper Co.
St. Louis Car Co.
Star Brass Works
Wood Co., Chas. N.

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Westinghouse E. & M. Co.

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National Carbon Co.

Flaxlinum Insulators
National Railway Appliance Co.

Floodlights
Electric Service Supplies Co.

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Flooring, Fireproof
Irving Iron Works

Flooring, Non-Slipping
Irving Iron Works

Floorings, Open Steel
Irving Iron Works

Flooring, Steel, Subway
Irving Iron Works

Flooring, Ventilating
Irving Iron Works

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Haskelite Mfg. Corp.

Forgings
Brill Co., The, J. G.
Carnegie Steel Co.

Frogs & Crossings, Tee Rail
Bethlehem Steel Co.
Ramapo Ajax Corp.
Wm. Wharton, Jr. & Co.

Frogs, Track (See Track Work)

Frogs, Trolley
Electric Service Supplies Co
Ohio Brass Co.
Westinghouse E. & M. Co.

Funnell Castings
Wm. Wharton, Jr. & Co.

Furnaces, Electric
American Brown Boveri Elec. Corp.

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General Electric Co.
Graybar Electric Co.
Westinghouse E. & M. Co.

Fuses, Refillable
General Electric Co.

Gaskets
Westinghouse Tr. Br. Co.

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Westinghouse E. & M. Co

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Brill Co., The J. G.
St. Louis Car Co.

Gauges, Oil and Water
Ohio Brass Co.

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Brill Co., The, J. G.
Carnegie Steel Co.

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Electric Service Supplies Co.
Westinghouse E. & M. Co.

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Bethlehem Steel Co.
Electric Service Supplies Co.
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General Electric Co.

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Westinghouse E. & M Co

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Bethlehem Steel Co.
Lorain Steel Co.

Gong (See Bells and Gongs)

Grating, Steel Subway
Irving Iron Works

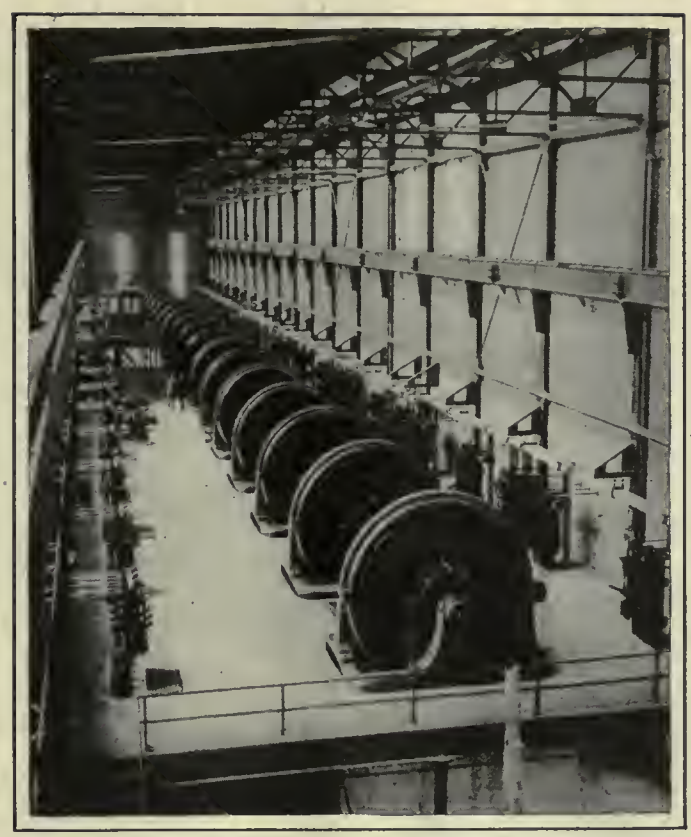
Greases (See Lubricants)

Grinders & Grinding Supplies
Metal & Thermit Corp.
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Railway Trackwork Co.

Grinders, Portable Electric
Railway Trackwork Co.

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BRUSHES used on the General Electric rotary converters in the plant of the Aluminum Company of America at Massena, New York, must withstand gruelling conditions. The extremely heavy currents, which are supplied for long periods of time to the aluminum smelting furnaces, tax brushes to the limit. To insure the successful, uninterrupted operation of these furnaces and of the plant machinery operated on DC, the dependability of converter brushes is essential.

Originally, the Aluminum Company of America installed NCC Brush Grade 259, on a test basis, on a few rotaries only. These brushes proved so thoroughly satisfactory that today they are in use on the DC ends of the entire battery of eighteen converters.

The manner in which National Pyramid Brushes have proved their worth to this great organization is striking evidence of their ability to meet the most strenuous conditions of use. National Pyramid Brushes will give you the same satisfaction. They will prove their mettle to many other organizations similar to the Aluminum Company of America, as well as mines, mills, substations and factories.

Let us demonstrate to you the remarkable qualities of National Pyramid Brushes. Our Sales Engineers are at your service and will welcome an opportunity to co-operate with you in solving any brush difficulties you may have.

National
Pyramid Brushes

Manufactured and guaranteed by

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Cleveland, Ohio — San Francisco, Cal.

Canadian National Carbon Co., Limited, Toronto, Ontario

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PITTSBURGH, PA. Arrott Power Bldg. No. 3, Barker Place *Phone, Atlantic 3570*

NEW YORK, N. Y. 357 West 36th St. *Phone, Lackawanna 8153*

BIRMINGHAM, ALA. 1824 Ninth Ave. N. *Phone, Main 4016*

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Wm. Wharton, Jr. & Co.

Guard Rails, Tee Rail & Manganese
Ramapo Ajax Corp.
Wm. Wharton, Jr. & Co.

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Elec. Service Supplies Co.
Ohio Brass Co.

Hammers, Pneumatic
Ingersoll-Rand Co.

Harps, Trolley
Elec. Service Supplies Co
More-Jones Brass & Metal Co.
Nuttall Co., R. D.
Star Brass Works

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General Electric Co.
Ohio Brass Co.
St. Louis Car Co.

Headlining
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Pantasote Co., Inc.

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Gold Car Heat. & Ltg. Co.
Nat'l Ry. Appliance Co.
Smith Heater Co., Peter

Heaters, Car, Hot Air and Water
Smith Heater Co., Peter

Heaters, Car Stove
Smith Heater Co., Peter

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Irvington Varnish & Ins. Co.
Okonite Co.
Okonite-Callender Cable Co.
Westinghouse E. & M. Co.

Insulating, Silk & Varnish
Irvington Varnish & Ins. Co.

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Irvington Varnish and Insulator Co.

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Electric Ry. Equipment Co.
Elec. Service Supplies Co.
General Electric Co.
Irvington Varnish & Ins. Co.
Okonite Co.
Okonite-Callender Cable Co.
Westinghouse E. & M. Co.

Insulation Slots
Irvington Varnish & Ins. Co.

Insulator Pins
Elec. Service Supplies Co.
Hubbard & Co.

Insulators (See also Line Materials)
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Elec. Service Supplies Co.
General Electric Co.
Graybar Electric Co.
Irvington Varnish & Ins. Co.
Ohio Brass Co.
Westinghouse E. & M. Co.

Interior Side Linings
Haskelite Mfg. Corp.

Interurban Cars (See Cars)

Jacks (See also Cranes, Hoists and Lifts)
Buda Co.
Elec. Service Supplies Co.
National Ry. Appliance Co.

Joints, Rail
(See Rail Joints)

Journal Boxes
Bemis Car Truck Co.
Brill Co., J. G.
St. Louis Car Co.

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Electric Service Supplies Co.
General Electric Co.
Westinghouse E. & M. Co.

Lamps, Arc & Incandescent (See also Headlights)
General Electric Co.
Westinghouse E. & M. Co.

Lamps, Signal and Marker
Electric Service Supplies Co.
Nichols-Lintern Co.
Ohio Brass Co.

Lanterns, Classification
Nichols-Lintern Co.

Letter Boards
Haskelite Mfg. Corp.

Lightning Protection
Elec. Service Sup. Co.
General Electric Co.
Ohio Brass Co.
Westinghouse E. & M. Co.

Line Material (See also Brackets, Insulators, Wires, etc.)
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Electric Ry. Equipment Co.
Electric Service Supplies Co.
General Electric Co.
Graybar Electric Co.
Hubbard & Co.
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Bethlehem Steel Co.
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Manganese Steel Switches, Frogs & Crossings
Bethlehem Steel Co.
Ramapo Ajax Corp.
Wm. Wharton, Jr. & Co.

Meters (See Instruments)

Motor and Generator Sets
General Electric Co.

Motor Buses (See Buses, Motor)

Motor Generators
American Brown Boveri Elec. Corp.

Motor Trucks
International Harvester Co

Motors and Control
Graybar Electric Co.

Motors, Electric
American Brown Boveri Elec. Corp.
General Electric Co.
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Motorman's Seats
Brill Co., J. G.
Electric Service Supplies Co.
St. Louis Car Co.
Wood Co., Chas. N.

Nuts and Bolts
Bemis Car Truck Co.
Bethlehem Steel Co.
Hubbard & Co.

Oils (See Lubricants)

Omnibuses (See Buses, Motor)

Oxy-Acetylene (See Cutting Apparatus, Oxy-Acetylene)

Oxygen
International Oxygen Co.

Packing
Westinghouse Traction Brake Co.

Paints and Varnishes (Insulating)
Electric Service Supplies Co.
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Paints and Varnishes, Preservative
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Paints and Varnishes for Woodwork
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Panels, Outside, Inside
Haskelite Mfg. Corp.

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Pinions (See Gears)

Pins, Case Hardened, Wood and Iron
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Planers (See Machine Tools)

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Pole Reinforcing
Hubbard & Co.

Poles, Metal Street
Bates Expanded Steel Truss Co.
Elec. Ry. Equipment Co.
Graybar Electric Co.
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Poles, Pneumatic
Westinghouse Traction Brake Co.

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Bates Expanded Steel Truss Co.
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Poles, Tubular Steel
Elec. Ry. Equipment Co.
Electric Service Supplies Co.

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Buda Co.

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Okonite-Callender Cable Co., Inc.

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A. S. Cameron Steam Pump Wks. (Ingersoll-Rand Co.)
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Pumps, Vacuum
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Punches, Ticket
International Register Co.
Wood Co., Chas. N.

Rail Braces & Fastenings
Ramapo Ajax Corp.

Rail Grinders (See Grinders)

Rail Joints
Carnegie Steel Co.
Illinois Steel Co.
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Rail Joints—Welded
Lorain Steel Co.
Metal & Thermit Corp.

Rail Welding
Metal & Thermit Corp.
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Hyman-Michaels Co.

Rails, Steel
Bethlehem Steel Co.
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Rattan
Brill Co., The J. G.
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Hale-Kilburn Co.
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Electric Service Supplies Co.
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Westinghouse E. & M. Co.

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Haskelite Mfg. Co.
Pantasote Co., Inc.

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Haskelite Mfg. Corp.

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Safety Car Devices Co.

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Brill Co., The J. G
Electric Service Supplies Co.
Nichols-Lintern Co.
Ohio Brass Co.
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Brill Co., The J. G.
St. Louis Car Co.

Sash Metal Car Window
Hale-Kilburn Co.

Scrapers, Track (See Cleaners and Scrapers, Track)

Screw Drivers, Rubber Insulated
Electric Service Supplies Co.

Seating Materials
Brill Co., The J. G.
Haskelite Mfg. Corp.
Pantasote Co., Inc.
St. Louis Car Co.

Seats, Bus
Brill Co., The J. G.
Hale-Kilburn Co.
St. Louis Car Co.

Seats, Car (See also Rattan)
Brill Co. The J. G.
Hale-Kilburn Co.
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East St. Louis & Sub. Ry. Co.
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Shades, Vestibule
Brill Co., The J. G.

Shovels
Brill Co., The J. G.
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Brill Co., The J. G.

Side Bearings (See Bearings, Center and Side)

Signals, Car Starting
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American Steel & Wire Co.
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Ramapo Ajax Corp.

Switches, Track (See Track Special Work)

Tampers, Tie
Ingersoll-Rand Co.
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Tee Rail Special Track Work
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Ramapo Ajax Corp.
Wm. Wharton, Jr. & Co.

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Elec. Service Supplies Co.
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Testing Instruments (See Instruments, Electrical Measuring, Testing, etc.)

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Consolidated Car Heating Co.
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Illinois Steel Co.

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Carnegie Steel Co.
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Ties, Wood Cross (See Poles, Ties, Posts, etc.)

Tires, Rubber
Fisk Tire Co., The
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Tool Steel
Bethlehem Steel Co.
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Metal & Thermit Corp.
Railway Trackwork Co.
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(Continued on Page 56)



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Bottom—Two CC-Paving Breakers cutting out pavement along track.

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ALPHABETICAL INDEX TO ADVERTISEMENTS

Page

A

Ajax Metal Co. 45
Allison Co., J. E. 25
American Brass Co., The 49
American Brown Boveri Electric Corp. 18-19
American Car Co. 32-33, 57
American Electrical Works 49
American Steel Foundries 4
American Steel & Wire Co. 47
Anaconda Copper Mining Co. 49
Archbold-Brady Co. 24

B

Babcock & Wilcox Co. 48
Baker-Raulang Co., The 30
Batea Expanded Steel Truss Co. 20
Beeler Organization 24
Bell Lumber Co. 25
Bemis Car Truck Co. 34
Bethlehem Steel Co. 39
Bibbins, J. Rowland 25
Brill Co., The J. G. 32-33, 57
Buchanan & Layng Corp. 24
Budd Wheel Company 26
Buda Co., The 47

C

Cameron Electrical Mfg. Co. 25
Carnegie Steel Co. 47
Chillingworth Mfg. Co. 50
Christensen Air Brake Co. 6
Cleveland Fare Box Co. 48
Collier, Inc., Barron G. 40
Consolidated Car Fender Co. 50
Consolidated Car Heating Co. 50
Cummings Car & Coach Co. 31

D

Day & Zimmermann, Inc. 24
Differential Steel Car Co., The 47
Dixon Crucible Co., Joseph 40

E

East St. Louis and Sub. Ry. Co. 51
Electric Equipment Co. 51
Electric Ry. Equipment Co. 49

Page

Electric Railway Improvement Co., The 25
Electric Service Supplies Co. 21
Electric Traction & Bus Co. 51

F

Fisk Tire Company, The 28
Ford, Bacon & Davis 24
"For Sale" Ads 51

G

General Electric Co. ..... 22, Back Cover
Gold Car Heating & Ltg. Co. 50
Graham Brothers 27
Graybar Electric Co. 41
Griffin Wheel Co. 44

H

Hale-Kilburn Co. 10
Haskelite Mfg. Corp. 50
"Help Wanted" Ads 51
Hemphill & Wells 24
Holst, Englehardt W. 24
Hubbard & Co. 48
Hyman-Michaels 51

I

Illinois Steel Co. 35
Ingersoll-Rand Co. 55
International Harvester Co. of America 29
International Motor Co. 8-9
International Oxygen Co. 50
International Register Co. 48
International Steel Tie Co., The. 7
Irving Iron Works 45
Irvington Varnish & Insulator Co. 49

J

Jackson, Walter 24
Jeandron, W. J. 44
Johnson & Co., Inc., J. R. 50

Page

K

Kelly, Cooke & Co. 24
Kelker, DeLeuw & Co. 24
Kuhlman Car Co. 32-33, 57

L

LeCarbone Co. 44
Lorain Steel Co. 47

M

Mack Trucks Inc. 8-9
McClellan & Junkersfeld 24
Metal & Thermit Corp. 49
Mohawk Rubber Co., The 25
More-Jones Brass and Metal Co. 44
Morganite Brush Co., Inc. 42
Morton Mfg. Co. 50
Motor Wheel Corp. ..... Front Cover

N

Nachod and U. S. Electric Signal Co. 49
National Brake Co. 23
National Carbon Co., Inc. 53
National Paving Brick Mfg's Ass'n. 38
National Pneumatic Co., Inc. 15
National Ry. Appliance Co. 47
Naugle Pole & Tie Co. 25
Nichols-Lintern Co. 50
Nuttall Co., R. D. 42

O

Ohio Brass Co. 5
Ohmer Fare Register Co. 46
Okonite-Callender Cable Company, Inc., The 49
Okonite Co., The 49

P

Pantasote Co., Inc. 44
Perey Mfg. Co., Inc. 50
Positions Wanted and Vacant 51

Page

R

Rail Joint Co., The 47
Railway Track-work Co. 50
Railway Utility Co. 50
Ramapo Ajax Corp. 49
Richey, Albert S. 24
Roebling's Sons Co., John A. 25
Rooke Automatic Register Co. 48
Root Spring Scraper Co. 50

S

St. Louis Car Co. 36-37
Sachsenmaier Co., George 51
Safety Car Devices Co. 16
Samson Cordage Works 49
Salzburg Co., Inc., H. E. 51
Sanderson & Porter 24
Searchlight Section 51
Silver Lake Co. 49
Smith Heater Co., Peter 50
Star Brass Works 48
Stevens & Wood, Inc. 24
Stone & Webster 24
Stucki Co., A. 50

T

Tool Steel Gear & Pinion Co. 45

U

Una Welding & Bonding Co. 50
Universal Lubricating Co. 48

W

"Want" Ads 51
Wason Mfg. Co. 32-33, 57
Westinghouse Elec. & Mfg. Co. 2
Westinghouse Traction Brake Co. 17
Wharton, Jr. & Co., Inc., Wm. 47
"What and Where to Buy" 52, 54, 56
White Eng. Corp., The J. G. 24
Wish Service, The P. Edw. 25
Wood Co., Chas. N. 49

Y

Yellow Truck & Coach Mfg. Co., Insert 11-12-13-14

WHAT AND WHERE TO BUY

(Continued from Page 54)

Trolley Bases, Retrieving
General Electric Co.
National Railway Appliance Co.
Nuttall Co., R. D.
Ohio Brass Co.

Trolley Buses
Brill Co., The J. G.
General Electric Co.
Westinghouse E. & M. Co

Trolley Material, Overhead
Electric Service Supplies Co.
More-Jones Brass & Metal Co.
Ohio Brass Co.
Westinghouse E. & M. Co.

Trolley Wheel Bushings
More-Jones Brass & Metal Co.
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Trolley Wheels & Harps
Electric Service Supplies Co
More-Jones Brass & Metal Co.
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Trolley Wheels (See Wheels, Trolley)

Trolley Wire
Amer. Electrical Works
Amer. Steel & Wire Co.
American Brass Co.
Anaconda Copper Min. Co
Graybar Electric Co.
Roebling's Sons Co., J. A.

Trucks, Car
Bemis Car Truck Co.
Brill Co., The J. G.
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Trucks, Motor
Graham Bros.
International Motor Co.
Mack Trucks, Inc.
Yellow Truck & Coach Mfg. Co.

Truss Planks
Haskelite Mfg. Corp.

Tubing, Yellow & Black Flexible Varnish
Irvington Varnish & Ins Co.

Turbines, Steam
General Electric Co.
Westinghouse E. & M. Co

Turnstiles
Electric Service Supplies Co.
Ohio Brass Co.
Perey Mfg. Co., Inc.

Turntables
Electric Service Supplies Co.

Valves
Ohio Brass Co.
Westinghouse Tr. Br. Co.

Varnished Papers & Silks
Irvington Varnish & Ins. Co.

Ventilators
Consolidated Car Heating Co.

Ventilators, Car
Brill Co., The J. G.
Nat'l Ry. Appliance Co.
Nichols-Lintern Co.
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Vestibule Linings
Haskelite Mfg. Corp.

Weatherproofing
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Welded Rail Joints
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Metal & Thermit Corp.
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Welding Wire and Rods
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Wheel Guards (See Fenders and Wheel Guards)

Wheel Presses (See Machine Tools)

Wheels, Car, Cast Iron
Bemis Car Truck Co.
Griffin Wheel Co.

Wheels, Car, Steel & Steel Tire
American Steel Foundries
Illinois Steel Co.

Wheels, Trolley
Elec. Ry. Equipment Co.
Elec. Service Supplies Co.
General Electric Co.
More-Jones Brass and Metal Co.
Nuttall Co., R. D.
Star Brass Works

Wheels, Steel Disc
Budd Wheel Co., The

Wheels, Wrought Steel
Carnegie Steel Co.
Illinois Steel Co.

Whistles, Air
General Electric Co.
Ohio Brass Co.
Westinghouse E & M. Co.
Westinghouse Traction Brake Co.

Window Sash, Locks and Racks
Morton Mfg. Co.

Wire Rope
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Roebling's Sons Co., J. A.

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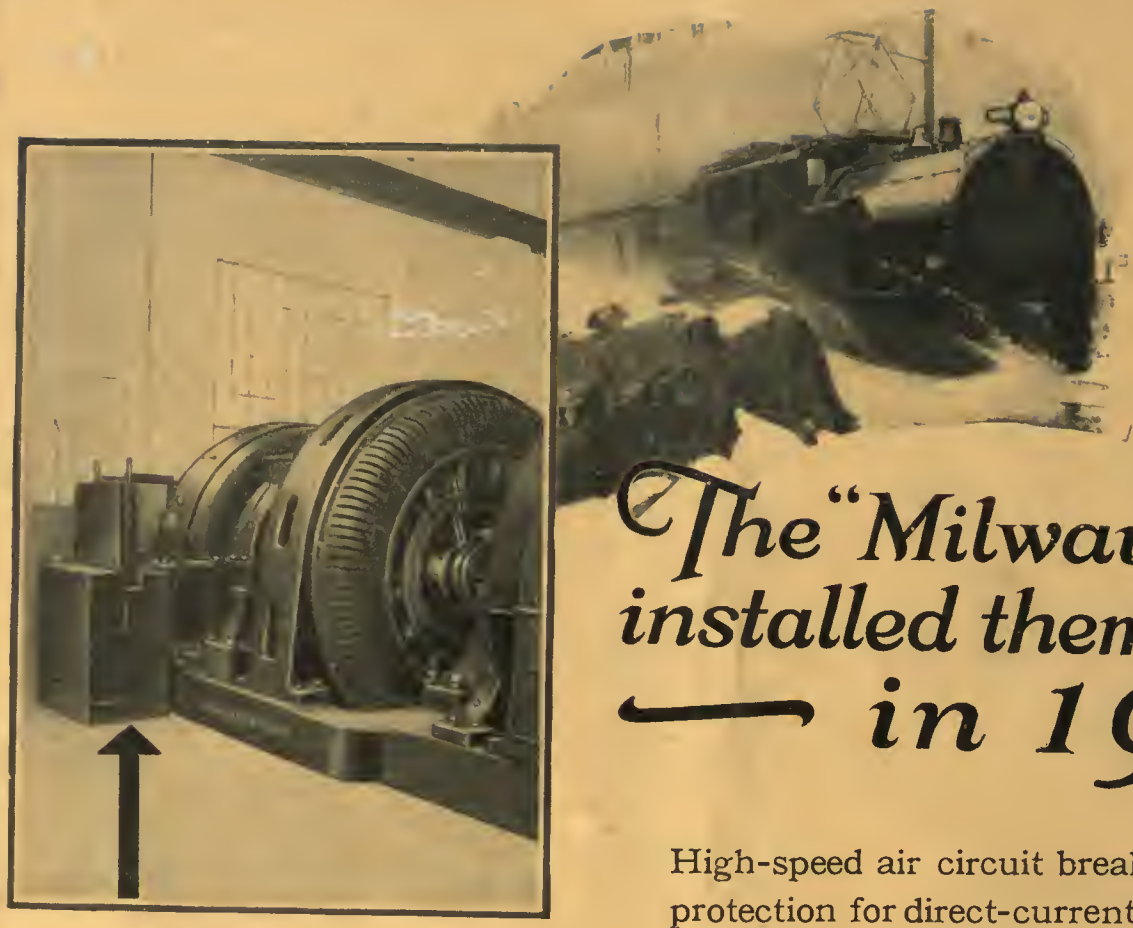


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3-19

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Vol 67
No. 20

Pages
831-870

CONTENTS

MAY 15, 1926

Editorials 831

Improved Testing Decreases Armature Open Circuits 834

BY W. C. WHEELER.

The difficult problem of locating partial open circuits in armatures so that repairs can be made before a total open circuit results has been brought nearer to a solution in Chicago by improved testing methods. Of three methods measurement of coil resistance with a wheatstone bridge has been found most reliable.

Trolley Wire Breaks Reduced 43 per Cent in Boston 837

Inspections are now made regularly on basis of number of wheel passes. Operating data are furnished by transportation department. Many interruptions to service have been prevented and line maintenance costs reduced.

Compensating Armature End Play 839

BY JESSE M. ZIMMERMAN.

Methods of measuring and compensating for armature end play are given, together with the solution of a particular problem.

Traffic Accident Causes Analyzed at Grand Rapids 840

New Shops Built for Fox River Line 841

BY BRUCE VERNON.

Roomy and well-lighted structure at Aurora is used for all major repairs, overhauling and car painting work of this railway. Machine tools are provided with individual drive.

Leather Upholstered Seats in Regular Cars Prove Popular in Cleveland 844

Improved Instrument for Car Operation Tests 845

BY A. W. SWAN, B.A.Sc.,

Maintenance Notes 848

Convenient Attachment for Blowing Out Controllers 848
Rope-Laced Compressor Suspension Used 848
Dust Washed from Air After Cleaning Armatures 849
Board Shows Location of Cars 849
Painting Destination Signs with Roller and Mask 849
Impregnated Motor Cleats Prevent Short Circuits 849
Disk Grinding of Motorman's Valves Saves Time 850
New Equipment Available 850
Improved Control Accessories Facilitate Installation 850
Bus Engine Piston with New Type Rings 850
Track Crossing Has Manganese Filler 851
One-Piece, Dustproof Meter Case 851

Association News and Discussions 852

American Association News 856

News of the Industry 857

Recent Bus Developments 862

Financial and Corporate 864

Personal Mention 868

Manufactures and the Markets 869

Putting Ideas to Work

IN HIS office the president of a large city railway property recently was found by one of the editors of the JOURNAL turning the pages of the issue that had just arrived. Glancing at a nearby file containing ELECTRIC RAILWAY JOURNALS, the editor noticed that the Annual Maintenance Number of the week previous was not there. On being asked the reason for its absence the president replied, "Yes, that was too good to keep. I marked it up for attention of the men on our system most closely connected with the work. What's more, I've asked for reports from the various department heads to show how our methods differ from those given in the articles and what changes are advisable in order to take advantage of the many helpful suggestions that issue contained."

On another property an editor found that the way engineer, after he reads his copy each week, clips out and files the various articles relating to his work. These are placed in folders so that all the information on a particular subject is kept together. This file contains advertisements as well as editorial matter, so when new equipment is needed the advertisements help determine where inquiries should be sent for the particular equipment desired.

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Change of Address—When change of address is ordered the new and the old address must be given, notice to be received at least ten days before the change takes place.

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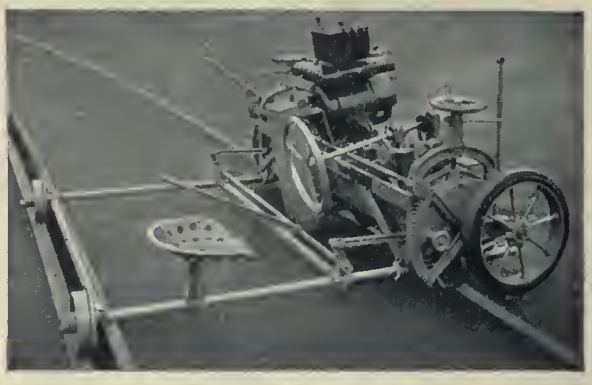
SAVING THE RAIL SAVES THE RAILWAY

Times have changed

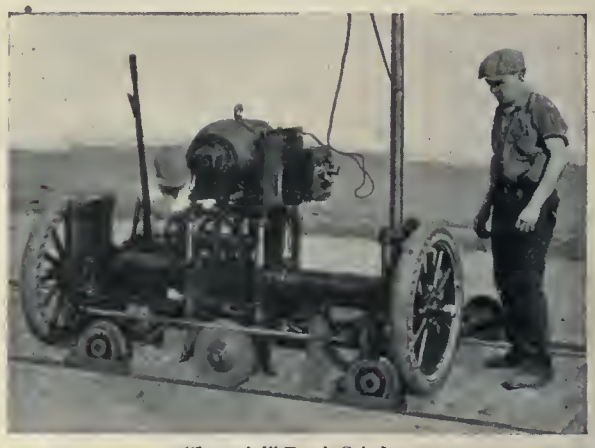
When only the super-solvent could afford to ride in anything but street cars, there wasn't much competition. Nowadays the great public is in a position to choose its transportation medium.

Passengers no longer have to ride in noisy, hard-riding vehicles. They want and choose speed and comfort.

How can you give such service on track not kept free of corrugations, cupped joints and battered special work? You simply cannot do it. You must save your rail to save your railway. And here is the equipment with which to do that job economically.



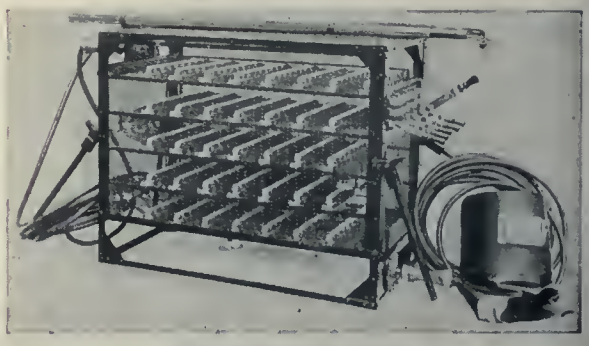
"Improved Atlas" Rail Grinder



"Imperial" Track Grinder



Reciprocating Track Grinder



"Ajax" Electric Arc Welder

Now is the time to order for early spring delivery.

Railway Track-work Co.

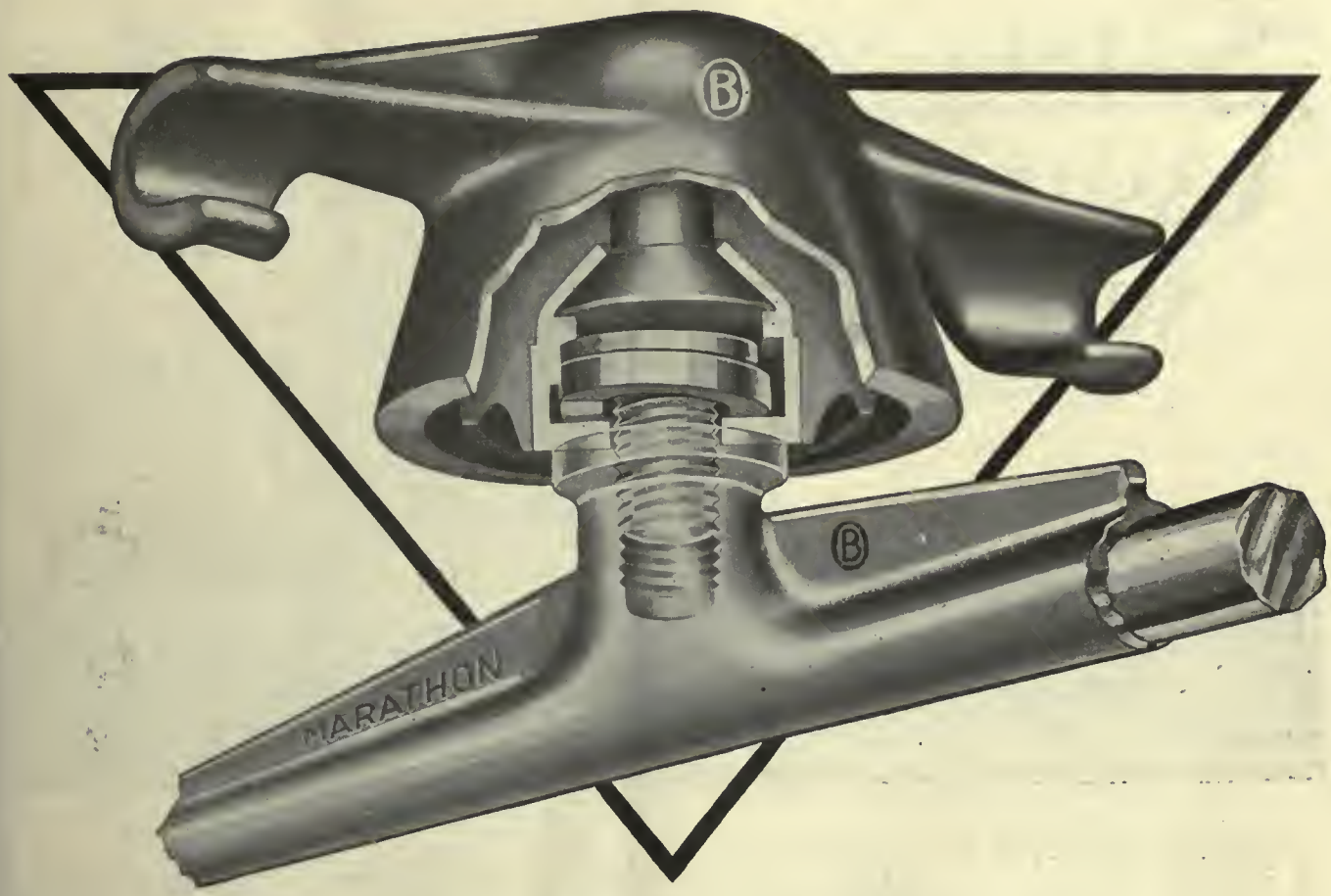
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1041

SAVING THE RAIL SAVES THE RAILWAY



For A Sure-Tight Joint Use An O-B Lock Hanger



Service records prove that O-B Lock Hangers and Marathon Ears provide a combination that insures the maximum in satisfactory service results. 350,000 wheel passes per ear on Marathons is by no means exceptional. Compare this with 180,000 wheel passes obtained with the usual type ears.

YOU can always be sure of getting a tight Joint betwixt hanger and ear, plus perfect alignment with the trolley wire, and with no more effort than a simple turn of the ear, when you use the O-B Lock Hanger illustrated. The tight joint eliminates trouble and rapid depreciation on this part of your overhead equipment.

Just screw the ear onto the stud until it contacts with the hanger. Then, instead of backing off the ear to secure alignment with the wire, turn it still further. An especially made O-B Steel Spring Washer inside the hanger gives you the extra leeway you need for aligning the ear with the wire. At the same time it gives you that sure-tight, trouble-proof connection.

Ohio Brass Company, Mansfield, O.
Dominion Insulator & Mfg. Co., Limited
Niagara Falls, Canada

69B

Ohio Brass Co.

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Three car train on the Pacific Electric Railway equipped with Westinghouse "K-1-A" Tight Lock Couplers.

WITH the adoption of train transportation rather than single car operation, to facilitate more economical and quicker service, many electric railways have solved their coupling problems by the installation of Westinghouse Tight Lock Couplers. In one operation, mechanical, air, and electric connections are made, thus eliminating obvious personal danger that the train crew going between the cars, to effect a coupling incurs. With a "click" Westinghouse Tight Lock Couplers perform these three distinct functions, thereby saving time and avoiding congestion at terminals.

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Advertise—those new cars!



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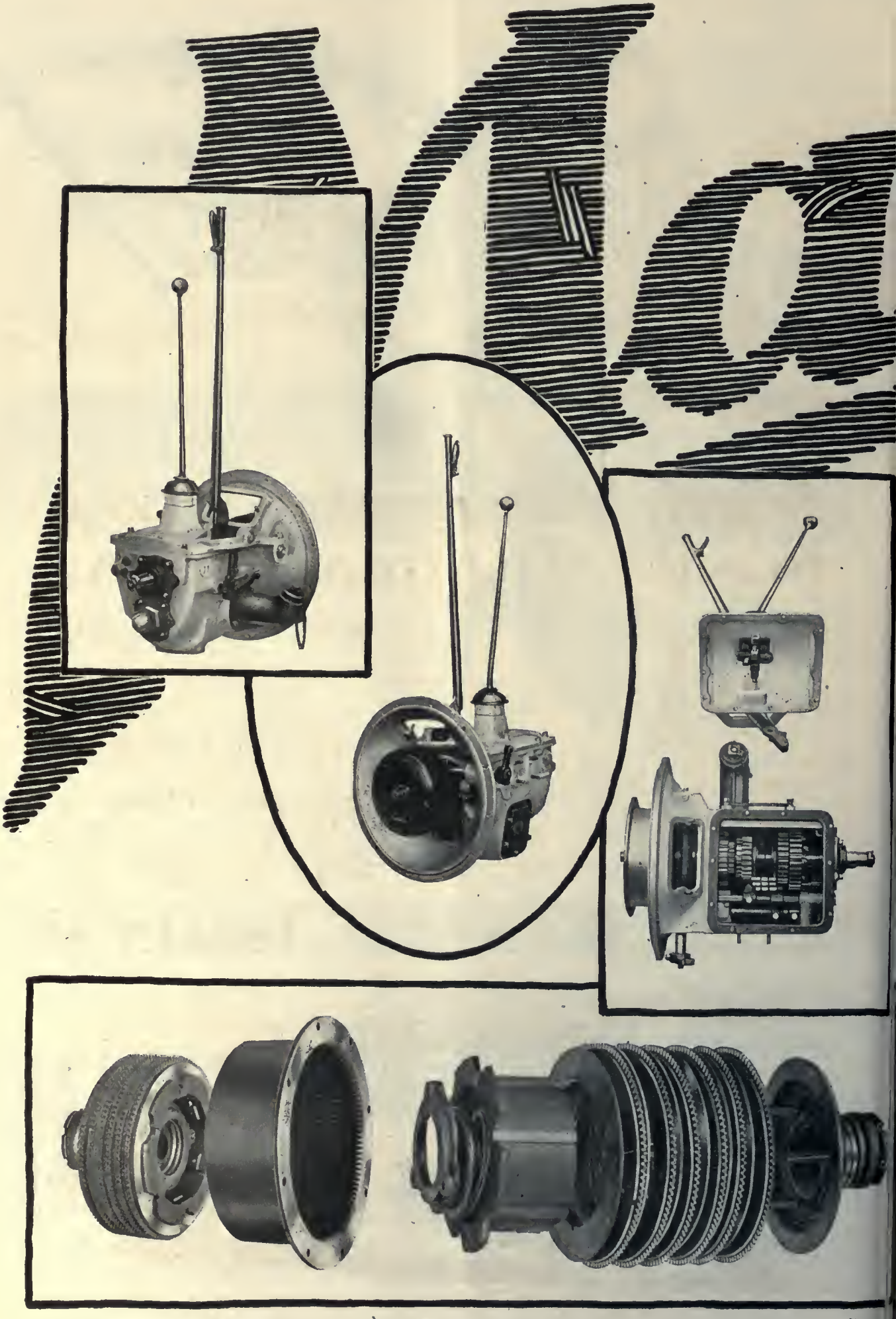
HUNTER-KEYSTONE SIGNS











The Bus as you buy it—

Mack leaves nothing undone in building its transmission—

If you could personally follow through the various steps in Mack gear cutting and heating, you would know where and why the Mack transmission gets its reputation for silent operation and long life.

Every Mack gear is heat-treated. Mack gears are accurately ground to form and pitch. The wide faces mesh with mirror-like smoothness, assuring silence in both third and fourth speeds.

And only Mack can use a shaft, ground on the generated grinding principle, because the Mack interrupted spline shaft is an exclusive feature.

As for the clutch, Mack builds a multiple disc type, accurately planned and proportioned for the hard service a bus clutch receives. Six sets of saw steel discs, driving and driven, each disc having 120 teeth and backed by two large springs, make an engagement that is both powerful and positive, with minimum slippage or wear.

The face of *every* disc is ground in order that the Mack clutch will perform equally as well in the first hour of your service as it will after a month or so has elapsed.

When Mack builds, it builds *right*, with long years of economy and service used as the master gauge for measurement.

Get in touch with the nearest Mack direct factory branch. Mack men are always proud to show what's under the hood and floor board.

MACK TRUCKS, INC.
INTERNATIONAL MOTOR COMPANY
25 Broadway, New York City

More than one hundred direct MACK factory branches operate under the titles of: "MACK MOTOR TRUCK COMPANY," "MACK-INTERNATIONAL MOTOR TRUCK CORPORATION," and "MACK TRUCKS OF CANADA, LTD."

The Mack Bus





Port Arthur Traction Co. International Creosoted Pine Ties installed in 1909 in street car service in the city of Port Arthur, Texas.

Cut Costs *and* Improve Service

International Creosoted Ties have many distinctive characteristics which make them ideal for Electric Traction use. These characteristics are principally—

Long Life: Creosoted Ties have an average life of over 20 years on heavy steam roads in spite of the terrific pounding of heavy rolling loads.

Durability: Creosoted Ties are decay proof and capable of withstanding mechanical wear—they do not break or crack.

Noiseless: Wooden ties are sound proofing—they absorb shocks and are practically noiseless.

Resilient: The wooden ties are more resilient and make easier riding and save equipment.

Easy to Replace: Wooden ties are easy to replace—an important factor in maintenance work.

Service Records: International Creosoted Ties in the New Orleans and Carrollton R.R.L.&P. Co. tracks after 25 years are still in use.

International Creosoting & Construction Co.

General Office—Galveston, Texas

Plants—Texarkana, Texas Beaumont, Texas Galveston, Texas

International HIGH GRADE CREOSOTED TIES

Are Ready for You Now!

Immediate Shipment made from stock



"Safety, Courtesy and Service"



CALUMET MOTOR COACH COMPANY

GENERAL OFFICES AND GARAGE, 150TH STREET AND COLUMBIA AVENUE. PHONE HAMMOND 640 6

HAMMOND, INDIANA

H. E. MINER,
PRES. AND GENERAL MGR.

Dec. 19th, 1925

Yellow Coaches help make good this company's slogan

YELLOW KNIGHT

Buy for Security —operate with Security

THE Amalgamation of Yellow Coach and General Motors proves the confidence of these two great organizations in motor coach operation *now*, five, ten, twenty years from now—*indefinitely*.

Welded in the common interest of strengthening both service and product, the protection to your investment is real. Doing business with Yellow Truck & Coach Manufacturing Company definitely wipes out all uncertainty regarding "orphan equipment" losses. It guarantees a degree of financial security and moral obligation that stands securely behind your initial investment and protects you thereafter for as long as you are in business.

The combination of Yellow Coach and General Motors is in the motor coach business *to stay*. General Motors have added their unlimited technical resources and tremendous manufacturing facilities to the vast operating and manufacturing experience of Yellow Coach.

The result is your opportunity to
buy and operate with security.

YELLOW KNIGHT

There is no substitute for experience

YELLOW TRUCK & COACH MANUFACTURING CO.
SUBSIDIARY GENERAL MOTORS CORPORATION
5801 WEST DICKENS AVENUE, CHICAGO, ILL.



EUCLID AVENUE, CLEVELAND

NP

COMPENSATING FOR LOST TIME

While the installation of traffic lights has generally helped traffic conditions, it has, in some cities, slowed up the surface cars which run within the traffic controlled zones. By reducing the standing time of cars at other stops along the line, National Pneumatic Door Operating Equipment has helped to make up this lost time.

NATIONAL PNEUMATIC COMPANY

***Executive Office*, 50 Church Street, New York**

***General Works*, Rahway, New Jersey**

CHICAGO
518 McCormick Building

MANUFACTURED IN
TORONTO, CANADA, BY
Railway & Power Engineering Corp., Ltd.

PHILADELPHIA
1010 Colonial Trust Bulding

"Safety, Courtesy and Service"

THE Calumet Motor Coach Company of Hammond, Indiana, uses the above slogan in connection with their operations.

Two words in the slogan tie up directly with the performance rendered by the fleet of Yellow Coaches they use—SAFETY and SERVICE. Drivers must furnish *courtesy*, but when it comes to engineering factors of safety that protect investment, and service that maintains schedules and delivers *low-cost, profitable miles*, Yellow Coaches shoulder the responsibility.

Yellow Coach performance is winning for Calumet. In November, 1924, this company commenced operation with sixteen coaches. In less than a year the number more than doubled.

The extract from their letter tells the story.

Yellow Truck & Coach Manufacturing Company, because of its vast operating experience, is thoroughly familiar with every factor that places the operation of motor coaches on a successful, revenue-earning basis.

"We started with 16 coaches and in less than a year the number more than doubled.

"The coaches up to the present time have averaged in excess of 60,000 miles each and are now in excellent running condition. The routes covered with 4-cylinder Yellow Coaches are locally in all sections of Hammond, and 6-cylinder Yellow Coaches are used from Hammond to 63rd Street, Chicago, which is a route about 13

Whether the paying experience of the Calumet Motor Coach Company (one of many successful Yellow Coach operations) can be duplicated for you can be determined by a detailed survey of your operating conditions. The difference of even a few cents in operating costs per mile will build up a valuable financial reserve.

Operators in all parts of the country are looking to this organization to make such surveys and disclose such savings. Repeat orders prove that they are not being disappointed.



miles in length. These 6-cylinder coaches in this interurban service have given unusually good results under extremely poor road conditions, previous to the completion of Indianapolis Boulevard.

"We have one semi-enclosed double-deck coach, the roof of which has been recently fully enclosed, and which on several trips has carried as many as 94 passengers at one time."

Buy for Security —operate with Security

THE Amalgamation of Yellow Coach and General Motors proves the confidence of these two great organizations in motor coach operation *now*, five, ten, twenty years from now—*indefinitely.*

Welded in the common interest of strengthening both service and product, the protection to your investment is real. Doing business with Yellow Truck & Coach Manufacturing Company definitely wipes out all uncertainty regarding "orphan equipment" losses. It guarantees a degree of financial security and moral obligation that stands securely behind your initial investment and protects you thereafter for as long as you are in business.

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The result is your opportunity to
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Speeding up service

To Speed up service—and yet maintain accuracy of collections—is a problem well solved by the use of

GLOBE

Tickets--Transfers--Passes

Designed by specialists for all standard and special requirements. Ask for further particulars and samples of our work.





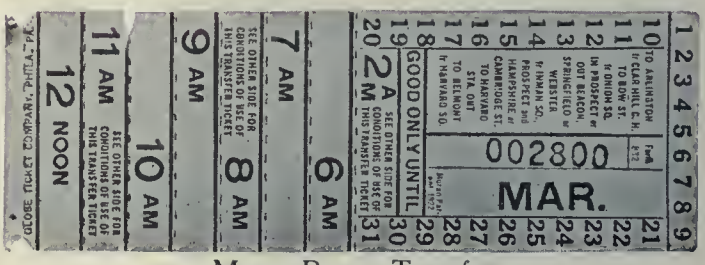
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116 N. 12th Street, Philadelphia, Pa.

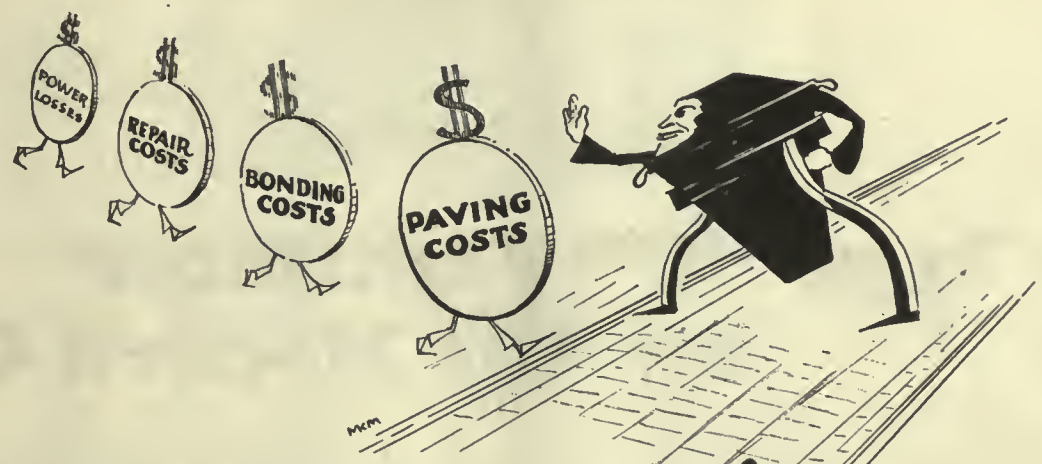
Los Angeles New York San Francisco

ALL WAYS GLOBE THAT'S THE TICKET





Moran Patent Transfer



Halt them!

Marching onward and upward, the rising tide of costs attributable to rail joints is reaching staggering proportions on many properties. Old joints being repaired over and over again are a source of ever-increasing outlay. There is one tried and proved method of halting the growth of these costs—a method the success of which has been absolutely established by installations of over twelve years' service on American railways and even longer on most European systems.

THERMIT WELDING

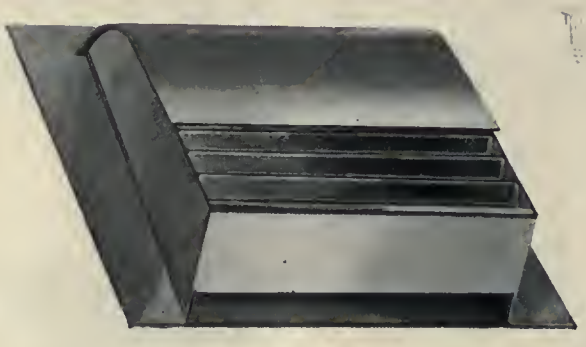
—eliminates rail joints completely
—makes life of track equal of rail
—does away with rail bonds
—greatly reduces paving damage
—reduces noise of cars
—costs no more than less satisfactory methods

THERMIT

THERMIT

METAL & THERMIT CORPORATION
120 BROADWAY, NEW YORK, N.Y.

PITTSBURGH CHICAGO BOSTON SOUTH SAN FRANCISCO TORONTO



The Type "C" Ventilator for the Modern Car

Low—inconspicuous—handsome—weather-proof—efficient, describes the N-L Type "C" car ventilator. Designed to give a maximum exhaust, the "C" ventilator does not sacrifice good appearance.

That a ventilator need not be ugly nor mar the roof line of the modern car is proved by the increasing popularity of the Type "C" ventilator. It has recently been specified on new cars for Alliance, Columbus, Gary, Memphis, Steubenville and others.

THE NICHOLS-LINTERN CO.
7960 LORAIN AVENUE CLEVELAND, OHIO

Represented in Canada by
Railway & Power Engr. Corp., Toronto, Ont.

In Great Britain by
United Automobile Services, Ltd.,
Lowestoft, England

In Australia, South Africa and Orient by
Nolan Smith & Co., Ltd., New York City

N-L
The Mark of a Better Ventilator



Light Tackle

EXPERT wielders of the 3-oz. rod appreciate the fact that weight is not necessary to secure strength.

In fact, weight may be a serious handicap.

Heavy equipment is not necessarily strong equipment.

An excellent illustration of this is the car wheel.

Although other wheels outweigh Davis Steel Wheels., the Davis develops a superior resistance to impact load.

Don't think that more weight means more strength. It is not so in the case of wheels.

The Davis "One-Wear" Steel Wheel is the logical solution of your wheel problems. Let us tell you why.

AMERICAN STEEL FOUNDRIES

NEW YORK CHICAGO ST. LOUIS

100 · YEARS · OF · MANUFACTURING · EXPERIENCE ·



325-M-Special

H-W Car Seats Help Modernize Your Equipment

Heywood-Wakefield's coach seating equipment is ideal for both new cars and replacements. The new features of comfort embodied in such types as our No. 325M Special are reflected in the complete H-W line. H-W seating experts will gladly co-operate with your plans for modernizing your present or prospective equipment. This service is free and without obligation.

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Frank N. Grigg,
630 Louisiana Ave., Washington, D. C.

The Railway & Power Engineering Corp.,
68-70 St. Antoine St., Montreal; Toronto; Winnipeg, Canada.



Type ET

Type EA



Have the bonds on *your* rail the carrying capacity you *paid for?*

The actual carrying capacity of a bond on the rail is not always the same as the circular mil area of the copper conductor. Some bonds may give the full rated capacity when applied, but soon deteriorate.

No, the copper doesn't usually change. The trouble lies in the bond terminals and depends entirely upon how those terminals are applied to the rail. In the first place the actual terminal area in contact with the rail must be eight times the cross sectional area of the bond, for traction rails average one-eighth as conductive as copper. And in the second place, this terminal contact must be intimate—the terminals must be truly a part of the rail if the contact is to be permanent.

All ERICO Brazed Bonds have a terminal contact with the rail of eight times the cross sectional area. Proper application of ERICO Brazed Bonds positively insures the maximum carrying capacity and conductivity of the bond. Due to the fact that the terminals are solidly brazed to the clean bright steel of the rail, the union of terminal and rail is permanent, electrically and mechanically. In fact we guarantee that properly applied, ERICO Brazed Bond terminals cannot become detached from the rail except by actual mutilation.

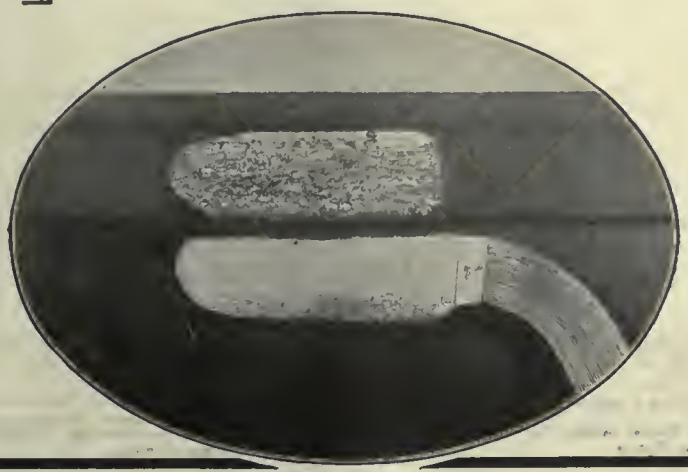
Over 30,000 lbs. were required to shesr this terminal from the rail. The area of copper *left on the rail* from the shearing process, is just eight times the cross sectional area of the bond. Every individual strand is united to the rail *in* a solid braze which insures the maximum bond conductivity, without injury to either the rail or the copper of the bond.

In no other bond do you get the permanent, full carrying capacity that you pay for, backed by a guarantee.

There are other interesting advantages in Brazed Bonding. Let us put the facts before you—sample applied terminals as well. Just tell us to whom to send the data and samples.

The Electric Railway Improvement Co.

2070 East 61st Place, Cleveland, Ohio



ERICO

ERICO



G-E Arc Welding Resistors at work on bonding and general track maintenance. The locomotive in the background is a G-E Electric Locomotive.

Two Men and a G-E Arc Welder

Two men and a G-E Arc Welding Resistor applied 60 to 70 bonds per day, working on track where bonding jobs were scattered. So states one electric railway company using G-E Welding Resistors.

Not only bonding but other jobs of track maintenance, such as the repairing of loose and worn track work, are readily cleaned up with this welder.

The G-E Arc Welding Resistor represents the highest advancement in resistor welders. Special resistance wire is ingeniously arranged to secure perfect insulation, fine ventilation, and high current capacity. The resistor is housed in a stout steel frame and is so compact that the entire set weighs but 180 pounds.

The price of these welders, fully equipped, is so low and their maintenance so negligible that every track maintenance department should have an adequate number for regular and emergency use.

Complete information available at your nearest G-E office.

G-E Arc Welding Resistors

—weigh 180 pounds

—do good work in quick time at low cost

—staunchly withstand wear of weather

—specially designed for welding rail bonds, fish plates, etc.

—operate on 400/650 volts

—welding current can be raised in small increments from 65 to 300 amperes

530-1

GENERAL ELECTRIC

GENERAL ELECTRIC COMPANY, SCHENECTADY, N. Y., SALES OFFICES IN ALL PRINCIPAL CITIES

Electric Railway Journal

Consolidation of Street Railway Journal and Electric Railway Review

Published by McGraw-Hill Publishing Company, Inc.

CHARLES GORDON, *Editor*

Volume 67 New York, Saturday, May 15, 1926 *Number* 20

Better Maintenance on New Equipment

THROUGHOUT the electric railway industry there is evidence of growing interest in both the replacement of obsolete equipment and in the improvement of new car design. Numerous examples are available which demonstrate conclusively that new, lighter and more attractive cars may completely change the status of an electric railway property.

As interest in the substitution of modern for obsolete cars has increased, much has been said and written about the reduction in maintenance costs that results. Obviously this is an important advantage. But there is some danger of carrying the effort to reduce costs to an extreme. When new cars first replace old, dilapidated equipment the contrast is so marked and the effect on the shop so striking that there is a tendency to overlook the application of the adage "A stitch in time saves nine" to a new car as well as to an old one. Since at first so little maintenance attention is required on new cars in comparison with those that have seen better days, there is some tendency to neglect little, necessary, day-to-day repairs that are inevitable. It is a mistake to cut maintenance appropriations to a point where it is not possible to keep the cars in first-class condition.

Some examples are available of the need for better maintenance of new equipment. Unless adequate provision is made for taking care of the wear and tear from service as fast as it occurs even a new car soon begins to look dingy and down at the wheels. Eternal vigilance is the price of good-looking equipment. Unless this price is paid the depreciation process becomes cumulative and much of the value of the investment in new cars is lost.

Stream-Lining Shop Furniture

MOST electric railway shops build their own cabinets, closets, benches, material bins, racks, etc. The size, arrangement and design of these is usually left to the particular foreman who orders the piece of equipment. The result obtained is a conglomeration that cannot be arranged with any degree of uniformity. In addition to giving a bad appearance, the cost of construction is greater than it would be were a more uniform design used. This certainly is a fertile field for standardization, not only for the individual railway property but for the industry as a whole.

Many advantages not at once apparent have been found through standardization of such shop accessories by the Department of Street Railways, Detroit, Mich. By establishing a definite series of dimensions for cabinets and similar furniture, a new sketch or drawing is not required each time a new piece is to be made. When installed, the new equipment can be lined up with similar pieces already constructed, so as to give a uniform appearance. Steel construction reduces fire hazards, and for storage of most shop material is preferable to wood. This standardization has been extended to include boxes for scrap material, cans for oily waste, rags, etc., ovens for drying out wood stock and other parts that have a tendency to collect moisture in storage, stands for overhauling various equipment parts, paint and oil receptacles, storeroom bins and shelving, stock racks for convenience of overhauling crews and the usual types of closets and cabinets.

Other roads can well profit by a similar standardization of shop furniture, and no doubt the scheme of standardization might be extended to all railways, so that manufacturers would find it advantageous to take up the building of shop furniture as they now provide office furniture and so develop a line that could be used by all railway shops.

Close Machined Fits Will Reduce Maintenance Troubles

INCREASED attention now being given in various electric railway shops to more accurate machining of fitted parts is very encouraging, as sloppy fits have been considered the rule rather than the exception on electric railway properties. Manufacturers who are used to close machined fits have criticised the machining methods of electric railways as being responsible for many of the failures of equipment. There is no doubt that the extra care and cost necessary to produce close fits will be paid for several times over in longer service from wearing parts and decreases in trouble to equipment.

In the past, more attention has been given to fitting armature bearings to their shafts than at other points in the car equipment. The present standard plus allowance for armature bearing bores before bearings are pressed into housings is from 0.006 in. to 0.020 in., depending on the diameter of the axle. Bronze bearings will close in approximately 0.002 in. when forced into place. Many roads are now insisting on a maximum clearance over the shaft of not more than 0.006 in. for armature bearings after they are in place. These roads report very satisfactory results.

The usual practice in regard to axle bearings is to permit a considerably greater initial clearance than for armature bearings. Limits of from 0.015 in. to 0.017 in. have been considered good practice. Much less attention is also given axle bearings to determine wear after they are placed in service, and often they

This is the issue in May that is devoted essentially to maintenance subjects

are continued in operation with entirely too great wear. There is no reason why closer fits cannot be used, and certainly more careful attention should be given to determine just what the wear is and to remove the bearings before excessive clearance results.

There are many other points in the car equipment where closer fits will prove of advantage. Journal bearings, journal bearing wedges, journal boxes and their guides, pedestal gibs, truck bolster chafing plates and the various fulcrum points for brake levers are some truck parts that should be watched carefully. Master mechanics should get behind the movement for more accurate machining in electric railway shops and show the managements that this is one way of reducing maintenance costs and preventing trouble. The results obtained will later prove an excellent example of the desirability of modern machine tools to produce more accurate machining.

Public Preference Must Receive Consideration

OPERATION of buses by the New Haven Railroad between Providence and Boston is objected to by H. C. Attwill, chairman of the Massachusetts Department of Public Utilities, principally because he believes that it would constitute an unwise duplication of facilities. His opinion, dissenting from that of the commission as a whole, is given in greater detail in the news pages of this issue. It is more economical, he says, to carry 70 passengers by rail than to carry 35 by rail and 35 by bus. That "there are those who prefer to ride in buses rather than on rails" is not a sufficient reason, to his way of thinking, to grant a certificate of convenience and necessity.

While this reasoning may be theoretically sound, it does not work out well in practice nowadays. It is futile to suppose that people who want to ride in automotive vehicles can be made to ride on rails by refusing permits for bus operation. They have their own private automobiles. Moreover, in this particular case competition from independent bus operators already has been established through the lack of interstate regulation. Denying the railroad the right to operate buses would not greatly increase the rail traffic, but would simply throw this business to the railroad's competitors.

Regulatory bodies can be of inestimable value to the public by protecting the established transportation agencies from the inroads of such competitors as tend merely to destroy a service which they are unable to replace. On the other hand, if the people who want some new type of transportation are willing to pay for it, and if the established agency is willing to furnish the service, it is better to recognize this public preference than to try to compel everybody to use some particular means. The *reductio ad absurdum* of that argument would be to make all steam railroad passengers ride in day coaches because they can be carried more economically that way than in Pullman cars.

Duplication of the local facilities of the electric railways is a more serious objection to bus operation by steam railroads. It would be most unfortunate if, as Mr. Attwill fears, such operation should develop into a fight for local traffic. By an agreement that the steam railroad buses shall not carry passengers between the points served by the electric lines that outcome usually can be avoided.

Make Shop Cleaning a Continuous Performance Instead of an Annual Affair

SPRING house cleaning, clean-up week in our cities and the inspiring freshness of new vegetation serve as excellent examples of the beneficial effects of clean surroundings. Much dirty work must be done in electric railway shops, but that is no reason why dirt and disorder should continue to exist. Cleanliness increases production, helps to produce better work and makes the workmen more contented. Many electric railways institute a spring cleaning campaign annually and good results are obtained. Why not continue to stress the need for cleaning up daily? Employees will take more pride in their work and will be more willing to broadcast the fact that they work for the railway if the shops are made something to be proud of.

One of the most impressive things noted by the members of the equipment committee of the American Electric Railway Engineering Association in their recent trip through the River Rouge plant of the Ford Motor Company at Detroit was the cleanliness of everything. The weather on that particular day was foggy and rainy and of a kind to produce a depressing effect, but the constant attention given to cleanliness in the yards and buildings made all parts inviting. The pleasing effect was commented on by several of the members of the party, and all went back to their respective railway properties with an inspiring example of the beneficial effect of cleanliness.

There is an old saying, "it is better to wear out than to rust out." Dirt causes disorders and may cover up defects. A layer of rust may do more damage than a year of wear, and the success of a property is most often judged by the appearance of its buildings, shops and equipment. Put on a bold front and make your railway property attractive by continual cleaning.

Maintenance Departments Demand First Consideration

GENERAL managers of electric railways, if they give the subject of maintenance sufficient thought, cannot fail to realize that it constitutes the foundation for the most effective methods of merchandising transportation. Not only is it essential that cars be kept on the road, but, also that they present an attractive appearance, be free from annoying delays to service and provide conveniences that passengers expect. The various maintenance departments are vital factors in the success of any railway property.

Many electric railways are laboring under severe handicaps due to unattractiveness of their cars, frequent breakdowns which upset schedules, and lack of properly maintained tracks or lines. A passenger on one of the electric cars in a Mid-Western city was recently heard to remark: "I wish they would take off these old cars and give us buses." When pressed for a reason for the remark, he volunteered: "Those new interurban buses are far more comfortable and attractive than the street cars, make better speed and are reliable." Modern cars properly maintained will do away with most complaints of that nature. New, up-to-date cars, however, will not long continue to please unless a high grade of maintenance keeps them free from troubles.

Cars do not produce revenue while in the shops for repairs. Every additional minute that a car is withheld from service means just so much loss. It is, there-

fore, most essential that the organization and tools provided for making repairs be kept at their highest state of efficiency and that the most modern tools be provided. A large number of machine tools may not be needed, but care should be used in their selection and arrangement so that the maintenance work can be done most efficiently.

Maintenance departments have not been given the consideration that they merit and have not received their share of funds with which to carry on properly. For attraction of increased riding, electric railways must establish service on a solid foundation, and that requires better shops, better machine tools, better material to work with and better wages for the maintenance force.

Clear Thinking and Lots of It Should Be the Keynote of Conventions

DIRECT concern to those in the electric railway industry was seen in a note sounded at the Galveston meeting of the Southwestern Public Service Association last month. Just as the meetings of a few years ago were maintenance talks, today they are not only that but much more. In fact, the burden is becoming heavy indeed and the problems to be studied require the careful consideration of operators and manufacturers as well. The service of ten years hence will require facilities and methods perhaps unknown today. This is a job for the manufacturer as much as for the operator. The manufacturers must lead in adapting new principles to products. They cannot afford to sit back and try to sell antiquated equipment nor wait to have the operator design his own product. Operators are not necessarily the best designers and should not be called on so to diversify their energy.

All this calls for a more serious consideration of the discussions of papers presented at meetings and conventions. The industry is moving rapidly and often through dangerous channels.

This is not a passing editorial fancy, but a thought that is having the earnest attention of important executives. The time is here that this question should be faced squarely to the end that railway meetings may be even more productive of progress than they are today. Hilarity and entertainment have their place, but today clear thinking and lots of it are the prime necessities.

Special Remuneration Often Leads to Stimulated Brain Action

VERBAL pyrotechnics may play a part in encouraging railway employees to apply a little gray matter to the subject of the company's welfare, but a suggestion of special remuneration cannot have other than a stimulating effect in backing up the talk. Hence the instant appeal provided by the "Suggestion Department" of the Pittsburgh Railways. All suggestions, both great and small, are carefully reviewed by the company, judged upon their respective merits and duly rewarded by suitable sums ranging from $5 to $75.

Employees have been quick to seize upon this opportunity of capitalizing on the ideas which crop up from time to time, even in the minds of the most mechanized of humans. These suggestions, not being limited to any particular field of railway activity, are offered by employees in every branch of the organization, and vary from the highly valuable to the utterly worthless in character. However, even should it require an average of ten worthless ideas to produce one real money maker or saver, who shall say that the end was not worthy of the means?

College professors are expected to maintain their prestige by the writing of frequent papers and books along the lines of their chosen subjects. Similarly, master mechanics who are ever on the outlook for methods of simplifying and cheapening maintenance work will stand high in the estimation of their company executives. Since they cannot themselves hope to devote sufficient time to accomplish the whole task, they must rely on their subordinates to provide usable suggestions. The suggestion department perhaps may be said to attain its ultimate of usefulness among the shop workers. A practical example of the functioning of this plan is detailed elsewhere in this issue.

Too Much of a Bad Thing at Akron

ECONOMIC waste has run high in Akron, Ohio, as a result of interruptions to its transportation service through strikes there in the last fifteen years. Statisticians would be required to count the cost to the local railway, the merchants and employees of the railway and other workers, to say nothing of the untold inconvenience inflicted on the residents of the city. These strikes have lasted from one to eleven days. Each time the result has been the same so far as the company is concerned—a settlement at the railway's expense with labor less amenable to discipline than before.

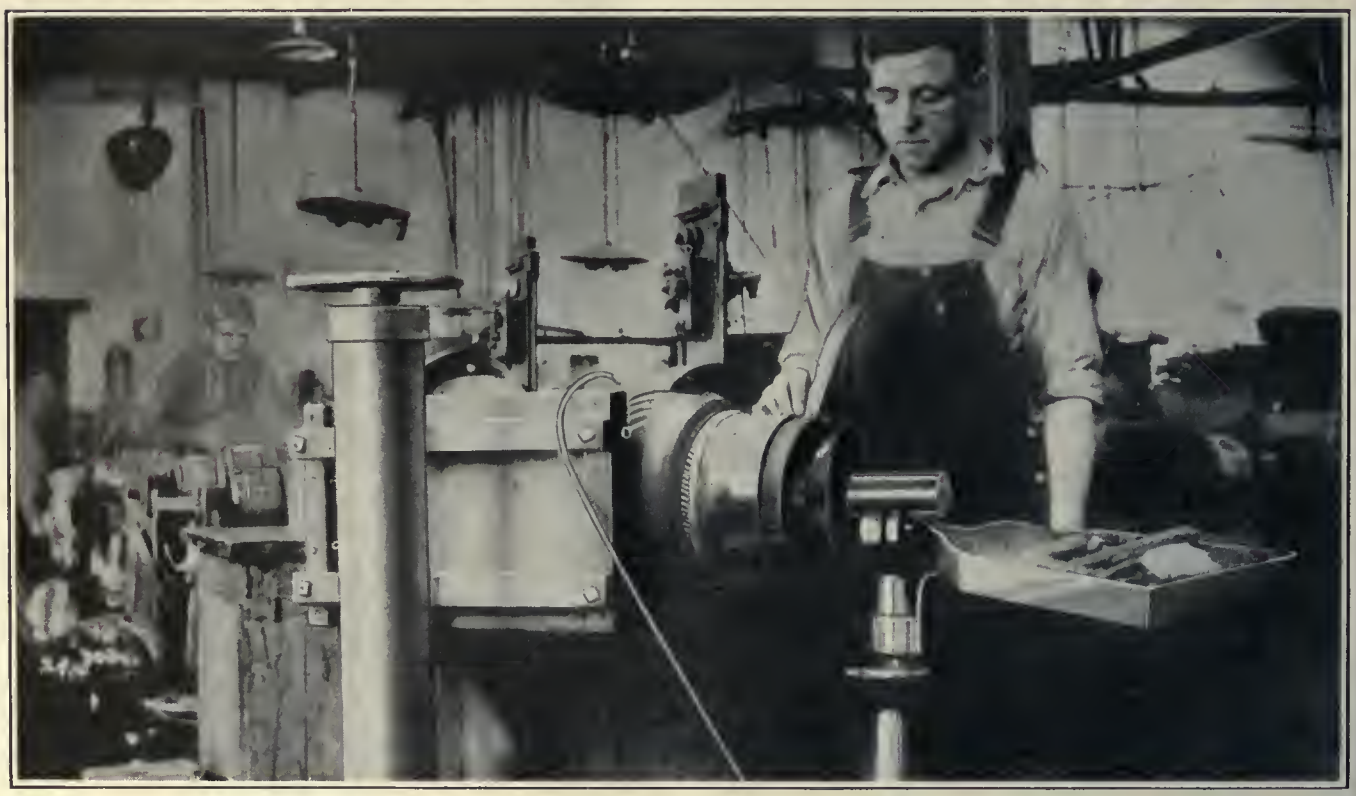
The record of events at Akron in these controversies may differ in its details from similar records elsewhere, but the story of union usurpation is very much the same everywhere in this industry. Always there has been the same disposition on the part of labor to go to the extreme by insisting on having its way about petty details. Of course, the question of an increase in wages —one of the issues in the present controversy—is not a petty detail either to the men or the company, but that of union insistence that the company deprive men who did not pay their union dues of their seniority, however much the union might like to magnify its importance, is a detail too petty to be made a basis for calling a strike. This last is an old issue in the history of union activity. It probably was not so much either of these issues as the summary way in which this latest strike was inflicted that prompted the Akron company to make a determined stand against the union. In this case the old union argument does not hold that any temporizing by it fortifies the opposition in its position by making it possible for the company to prepare adequately to give battle.

Sympathy with labor, particularly in a city like Akron, is not usually slow to assert itself. Yet in this instance the public has been apathetic. It is apathetic because it has been fed up on this sort of thing and because it has appraised the issues correctly—issues that have been clearly stated in the JOURNAL. The story makes interesting reading, particularly that part of it which has to do with the conditions under which service is being restored. When all things are considered, and with due respect to the company, the wonder is not so much that it was decided in this instance to see the issue through but that the company went so far as it did in its effort amicably to reach a settlement.

Improved Testing Decreases Armature Open Circuits

The Difficult Problem of Locating Partial Open Circuits in Armatures so that Repairs Can Be Made Before a Total Open Circuit Results Has Been Brought Nearer to a Solution in Chicago by Improved Testing Methods—Of Three Methods, Measurement of Coil Resistance with a Wheatstone Bridge Has Been Found Most Reliable

By W. C. Wheeler
Engineer of Equipment Chicago Surface Lines, Chicago, Ill.



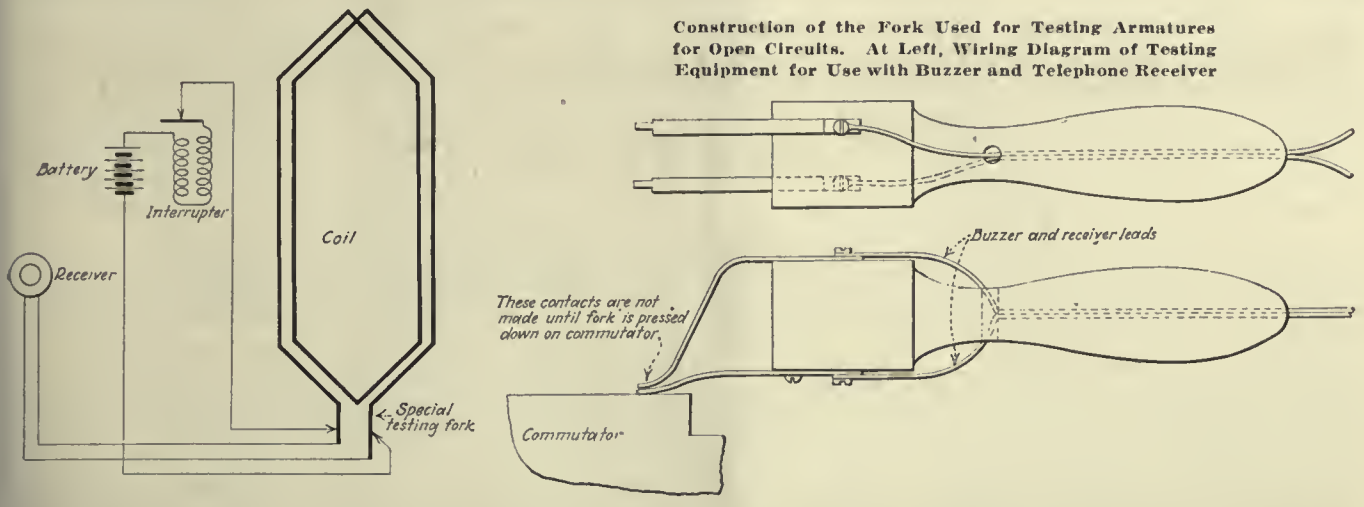
Transformer Test Provides an Alternating Field in Which the Armature Is Placed to Develop an Alternating Emf. in the Coils. A Piece of Metal Bridges Adjacent Commutator Bars

DUE to the characteristics of railway motors, an open circuit in the armature windings will in time cause flashing and consequent arcing and burning of the commutator. This necessitates removal and repairs to the armature and winding. Some railway men believe that open circuits are caused by vibration of the coil structure, which stresses the lead where it enters the commutator ear, and in time results in a fatigue break. Others hold that the crystallization of hard copper causes opens, or that the so-called bucking of the motors during emergency stops is a contributory factor.

Whatever the cause, it is well known that some armatures are more prone to develop open circuits than others. This may be inherent to the design or other causes which are met with in operation. It has been noted that some armatures will not have an open circuit for years and will then become persistent offenders, or repeaters. Observations made also would indicate that the formation of an open circuit in a winding may be a gradual process and that an armature may run for some time with a great many leads practically open. On the Chicago Surface Lines armatures have been found operating with ten to twenty opens and one armature which was sent in for repairs due to damage caused by one open circuit was found to have 51 top leads broken.

Taking these points into consideration the testing of armatures when they are repaired becomes very important. If potential opens can be located while the armature is undergoing repairs, they can also be repaired and the armature will remain in service for a considerably longer time than would be possible had it been allowed to return to service with one or more leads half broken or wholly broken in two but still in contact.

In the development of testing methods for open circuits by the armature repair department of the Chicago Surface Lines three electrical methods have been introduced at different times, all of which have been used in connection with a mechanical test of each lead with a

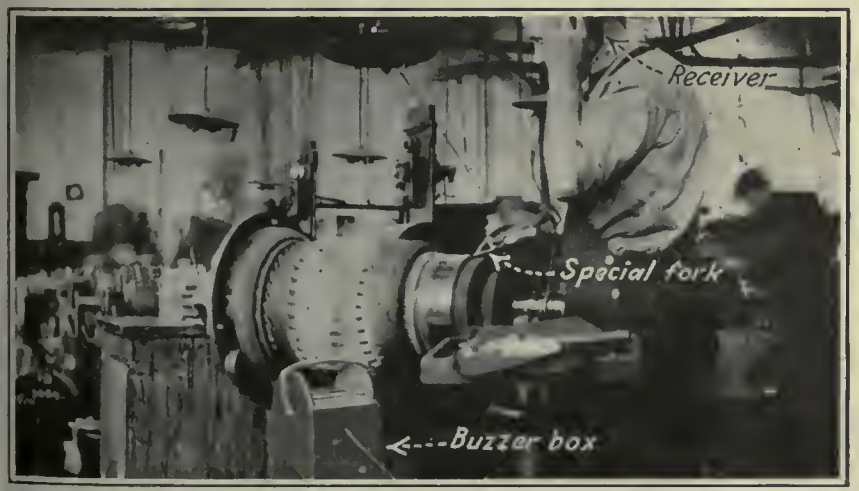


Construction of the Fork Used for Testing Armatures for Open Circuits. At Left, Wiring Diagram of Testing Equipment for Use with Buzzer and Telephone Receiver

small metal rod which is used to pry up any leads that are not securely fastened. Obviously this mechanical test can be used only on top leads and will locate only leads that are wholly broken in two, but the ends of which may still be in such close contact that they have not caused trouble.

The first electrical method introduced was that of a simple transformer test. The apparatus used is shown in an accompanying illustration. In this test a pole piece is mounted on a movable and adjustable stand and a coil is placed around the pole piece and is connected to an alternating current supply. When this stand is so placed that the armature is in the alternating field produced by the coil, the armature coils within the influence of this field have an alternating electromotive-force developed in them. If a piece of metal is used to short two commutator bars to which one of the energized coils is attached sparking will occur at the bars. The presence of this sparking is taken to indicate that the coil is in good shape. However, due to the character of the winding in most railway motor armatures, it is necessary to have two opens in separate coils to prevent the occurrence of a spark at the commutator under the above conditions. This condition would allow armatures to be passed as being O.K., when they actually contained real opens. After being in service a short time they would develop trouble and have to be returned for repairs. Thus an armature which would have been repaired if it had been properly tested might become a repeater because the open was not found when the armature was tested before leaving the repair department.

The second electrical method made use of an intermittent current which was passed through two parallel circuits, one of which was the armature coil under test and the other a low resistance telephone receiver. The intermittent current is supplied from a dry battery as a primary source through a buzzer. Connections are made through a four-pronged fork so that the buzzer operates only when the fork is pressed on the commutator bars. The buzzer and battery are conveniently mounted in a box. This test requires a bar-to-bar test on the commutator, the condition of the coil being indicated by the intensity of sound in the receiver. It will be seen from the wiring diagram shown for this test that when the connections at the commutator ears are in good shape and the coil is not open that due to its low resistance the greater portion of the current passes through the coil and only a small amount through the telephone receiver. If the connections are poor or the coil partly open a greater amount of current passes through the receiver, and if the coil is open all the current passes through the receiver, producing a loud sound. Thus the intensity of the sound in the receiver is an indication of the condition of the coil. An experienced operator can detect coils that are not sufficiently open to cause trouble, but which soon will break down. This test is very simple to install and cheap to operate. It is





At Left, An Intermittent Current Supplied from a Dry Battery Is Passed Through a Buzzer. A Telephone Receiver Is Used to Approximate the Resistance by the Volume of Sound Produced. At Right, Buzzer Box Showing the Receiver and Special Testing Fork Used

superior to the first method in effectiveness, although shop noises are a disadvantage in its use. If the buzzer is wrapped in felt or other sound-insulating material and installed inside the box without rigid fastening its sound is muffled and there is less chance of confusing it with the sound heard in the receiver.

WHEATSTONE BRIDGE METHOD MOST ACCURATE

The third and latest electrical test used in the Chicago shops is by far the most accurate and reliable test devised so far. It also is the most expensive to install and operate. This test makes use of a Wheatstone bridge for measurement of the electrical resistance of each individual circuit in the armature by a bar-to-bar test. Two men are required to make the test. A Leeds & Northrup Wheatstone bridge is used. This instrument is provided with a dial on which resistance from 0 to 100 ohms may be read directly. Provision is made for use up to 1,000,000 ohms by use of multipliers contained within the instrument. It is very handy for other resistance measurements, but particularly so for testing armatures.

A fork is used with this instrument, which is similar to the one used in the second method of testing except that it has only two prongs. In making the test contact is made with the fork on two adjacent commutator bars and the dial is adjusted until the galvanometer comes to rest. On the common sizes of street railway motors this value is in the order of 0.14 to 0.25 ohms, including the low resistance leads from the instrument.

After the position of the dial has been determined for the armature it is only necessary to watch the galvanometer as the fork is passed from bar to bar around the armature. It is necessary to pause on each bar long enough for the galvanometer to come to rest, as the movement from one bar to another usually causes a slight deflection.

If the armature is in good condition the galvanometer will register the same for all the bars. If, however, there is a poor connection to the commutator or if the cross-section of the wire has been materially reduced at any point, such as would be the case had a break started, the galvanometer would deflect to one side, indicating that the resistance between these two bars was higher than normal. It has been found that a deflection of three points on the galvanometer scale will indicate a partial open circuit or a poor joint at the commutator ear. A deflection of five points usually indicates a clean break, while with any deflection of from three to ten points the ends of the leads may be found in contact, but the wire broken completely.

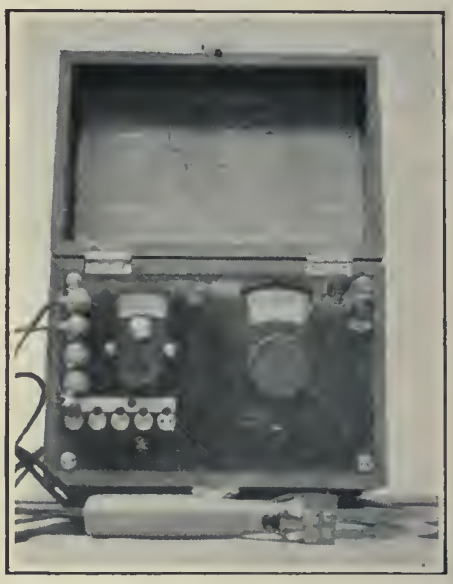
Very satisfactory results have been obtained with the last method of testing, and in comparative tests open circuits have been found with it that were not located in other ways. This test is given all armatures just before they are returned to service, as it has been found that in some cases opens will become evident during the dipping and baking process that could not be located before. The test is also used while the armature is being repaired so that all opens found may be repaired at one time.

It is felt that this practice makes for armatures that are in the best possible condition when they leave the repair department, in that they have been cleared of the potential opens or partial breaks in the leads and that consequently they will remain in service for longer periods before failure.

Although this method of testing was in service for only about six months of last year, the total number of armatures repaired on account of open circuits during the year was 12 per cent less than those repaired for the same cause during the preceding year.

The Leeds & Northrup instrument for the improved test costs more than other testing equipment that has been used, but the money is well invested when the amount of labor and time saved are taken into consideration. This instrument has a decided advantage over the millivoltmeter method in use in some shops for it is self-contained and easily transported to any point in the shop. The instrument will also be found particularly useful for making other electrical tests on car equipment. On small properties, where continual use in the armature repair department is unnecessary, such an instrument can be used to good advantage for locating poor contacts or open circuits in the car wiring and for testing complete motor connections after assembly.





At Left, Electrical Resistance Measured by a Wheatstone Bridge Has Been Found the Most Accurate and Reliable Test for Open Circuits. At Right, the Instrument Used for Measuring Resistance Is a Leeds & Northrup Wheatstone Bridge Ohmmeter

Trolley Wire Breaks Reduced 43 per Cent in Boston

Inspections Are Now Made Regularly on Basis of Number of Wheel Passes—Operating Data Are Furnished by Transportation Department—Many Interruptions to Service Have Been Prevented and Line Maintenance Costs Reduced

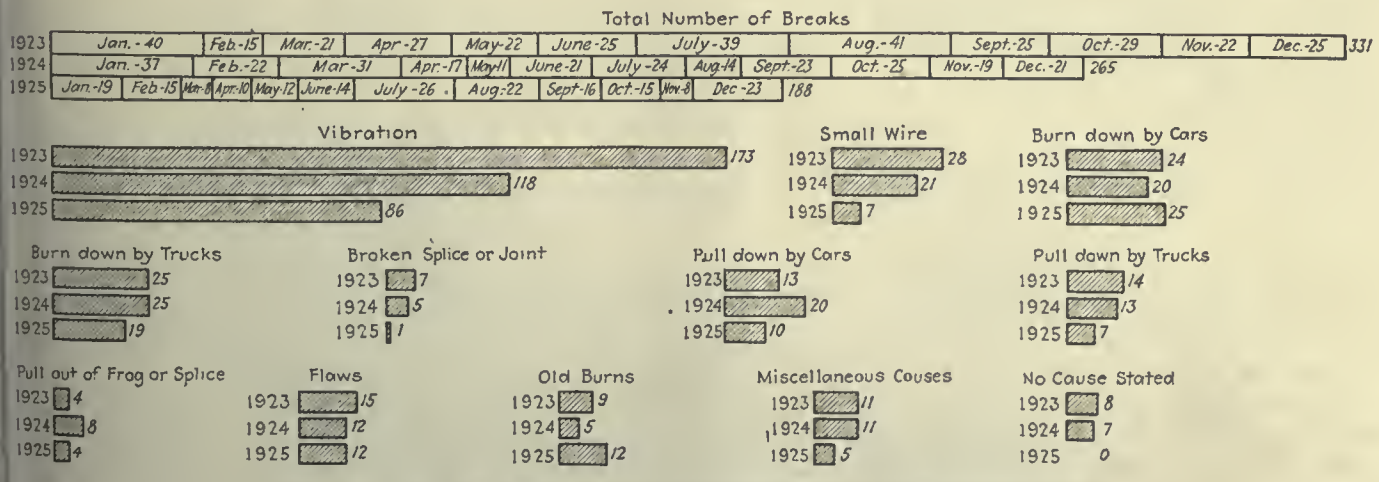
USE rather than the mere passage of time has been made the basis of inspecting overhead wires on the Boston Elevated Railway system. Previously it was the practice to make such inspections about once in four months regardless of the wear on the wire during this period. It was felt by J. P. Boyden, superintendent of wires, that this method was unsatisfactory because of the difference in the wear on various sections. For example, in the Tremont Street subway there are 2,295 trolley wheel passes per day, while on some of the outlying lines the number is as low as 61. The basis was changed, therefore, so that inspections are now made on a basis of 200,000 trolley wheel passes. This has effected a reduction of 43 per cent in wire breaks and a corresponding decrease in line maintenance costs.



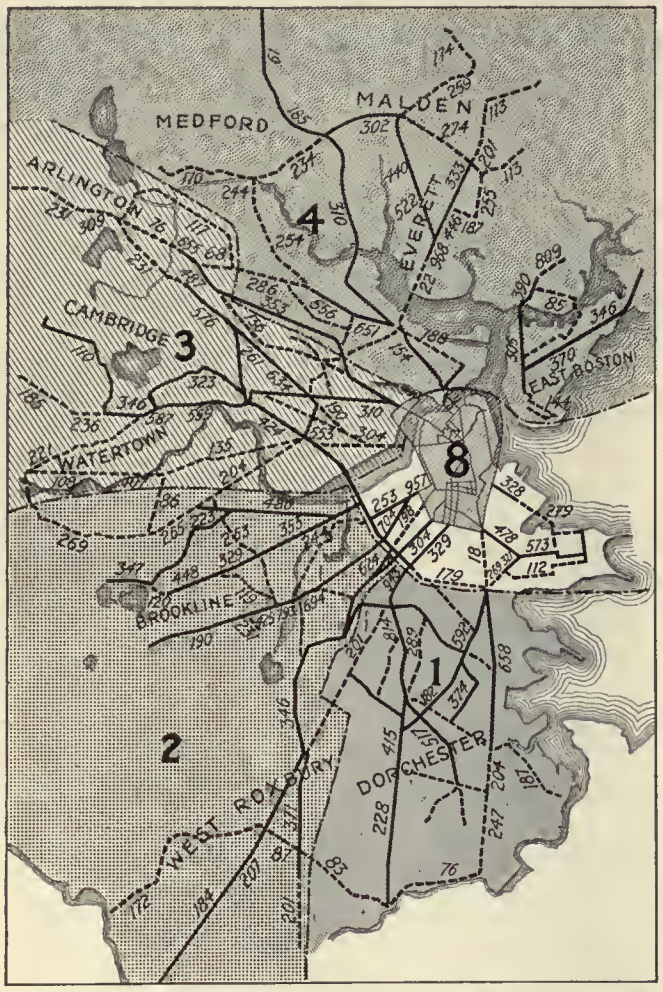
Line Crew and Tower Truck of Boston Elevated Railway Engaged on Periodic Ear Renewal Work

In 1923 under the old system there were 331 trolley wire breaks. During 1924, the transition period from the old to the new system, there were 265 breaks. In 1925, with the new inspection method in effect throughout the year, there were only 188 breaks. The record for these three years is shown graphically in an accompanying chart. Totals are subdivided according to months and also according to causes of breaks. The latter classification is based on reports made by the foremen of repair crews on the form which is reproduced on another page.

As an aid to the line department, the time-table department has prepared a map showing the daily number of car passes on all lines of the Elevated system. Where the service is more frequent than 300 cars per day or where vehicular traffic is particularly heavy inspection of overhead wires is done at night. This trolley wheel pass map is shown in an accompanying illustration, the day and night inspection lines being



Record of Trolley Wire Breaks for Past Three Years Shows Steady Improvement



System Map Showing Daily Number of Trolley Wheel Passes

Solid lines indicate routes where inspections are made at night; dotted lines are day inspection routes. Divisions correspond to the operating divisions of transportation department except that the downtown area is handled separately and retains its former designation, "Division 8." This comprises the shaded and unshaded areas in the central part of the city. All work in the shaded area is done by night crews.

Form 6463 1-25-2500 63

Report on Ear Renewals and Gauges of Wire

Date July 21-25 Street Boylston St. B line
From Express St To 60/153

Pole No.	Gauge	Pole No.	Gauge	Pole No.	Gauge	Pole No.	Gauge	Pole No.	Gauge	Pole No.	Gauge
60/39		60/51	S1	60/73	2/0	P.O.1	S1	60/137	2/0	P.O.1	G1
Frog	2/0	60/53	S2	60/76	G1	P.O.2	S1	60/139	SF 2/0	60/153	S1
P.O.1	2/0	60/55	S1	60/77	SF G1	60/125	SF 2/0	60/141	G1		
P.O.2	S2	60/57	S2	60/79	S1	P.O.1	S1	60/143	G1		
P.O.3	S2	60/59	S2	P.O.1	S1	P.O.2	S1	60/145	G1		
Joint	S1 S1	60/61	S1	P.O.2	G1	P.O.3	G1	P.O.1	S1		
60/41	S1	60/63	SF 2/0			60/127	2/0	60/147	S1		
60/43	2/0	60/65	2/0	60/131	G1	60/129	S1	P.O.1	G1		
60/45	S1	60/67	2/0	P.O.1	2/0	60/131	G1	60/149	SF G1		
60/47	S2	60/69	2/0	P.O.2	S1	60/133	G1	P.O.1	2/0		
60/49	SF S1	60/71	2/0	60/123	S1	60/135	2/0	60/151	G1		

6-4/0 S.F. Ears.

No. of Ears Renewed 47 D.Y. Dow Ears 2 Mac Jr. Ears
Ears Tubed 5 Ears Tufed
New Wire Cut in at 60/47 S.B
Remarks: Cut Bd. Rail
O New piece has been cut in.
Signed J. E. McGurk.

Instructions to Foreman
Mert 9-0-27.
Renew 60/39 Frog to 61

Date Supt. of Wires J. P. B.

Form Used to Show Condition at Inspections

Note—*G1* denotes gage 1, etc. *S1* denotes slack gage 1; this is between gage 1 and gage 2. *SF* denotes side feed ear.

distinguished by different symbols. All work in the congested downtown district is done by the night crews. New maps are prepared from time to time by the timetable department when rerouting or other changes cause a substantial alteration in the amount of service operated. Small schedule changes are believed to be unimportant from the viewpoint of the line department and no attention is paid to them.

Renewing of ears and gaging of wire are done at the same time. A program of ear renewal was begun in the spring of 1924, reports being made on a form which is reproduced herewith. Ears are removed as soon as the lips are worn down so that the trolley wheels are running on the wire, as it is thought to be cheaper to renew ears than to renew wire.

At the same time that the ears are inspected the diameter of the wire is measured. The wire generally used on the Boston Elevated system is size No. 00. When it has been worn down to No. 3 B. & S. gage it is renewed. Outdoor overhead wire has been found to have a life of about 1,000,000 wheel passes, while in the subway the average life is about 2,000,000 passes. The longer life in the subway is attributable, it is thought, to closer spacing of supports and greater tension in the wire itself. Ears have been found to have an average useful life of

Form 5756 1-25-500 63

OK. V Lowes.

BOSTON ELEVATED RAILWAY
POWER DEPARTMENT
REPORT ON TROLLEY WIRE BREAKS

Date 1-6-26

Street Kearney Sq. City Wash. St. North Near At Pole No. 109/33 E. Time 7.55 a. m. p. m.

POINT OF BREAK (Put (X) opposite correct location)		CAUSE OF BREAK (Put (X) opposite correct cause)	
Under car at leaving end		Worn wire	
Splicer	Kind	Crystallization	X
Section insulator		Flaw	
Frog	X	Burned down by	
Crossing		Pulled down by	
Other fitting		Pulled out of fitting	
In span		Old burn	

REMARKS: (In this space give full additional information which will help explain cause of break)
109/33E Cut bd wire broken at taking end of frog Rep with 5 ft N.D Wire 2 Drew Splice ears Clear at 8.05
Cause Vibration No body hurt

Reported by Rapson

Send all broken ends to Supt. of Wires, 536 Harrison Ave., Boston
Size of wire 2/0 Kind Std. E.E. 376 Remarks: P. V. Foote
Date installed May 10-22 Life 3 7/12 years 1,247,650 car movements. Div. 4
956 Cars per day.

Form Used to Record Location and Cause of Trolley Wire Breaks

about 250,000 trolley wheel passes. Thus there is a safe margin between the 200,000 wheel pass inspection and the limit of wear of the ears.

A double card index is kept in the office of the superintendent of wires. Each section has a card on which is recorded the daily number of car passes and the dates of all previous inspections and renewals. A dated file is also kept showing the work done each day.

Two day crews and three night crews are employed on line maintenance work. Each crew consists of a foreman, a driver and two linemen. Four White trucks with McCardle towers are used, as well as two tower cars for work in the subway and on private right-of-way. Thus there are altogether six towers for the five crews. In addition the company has five emergency tower trucks. At times some of these in the outlying sections are used on maintenance work, but the downtown emergency is never used for any other purpose.



Measuring the Distance Between Wiper Faces of an Armature

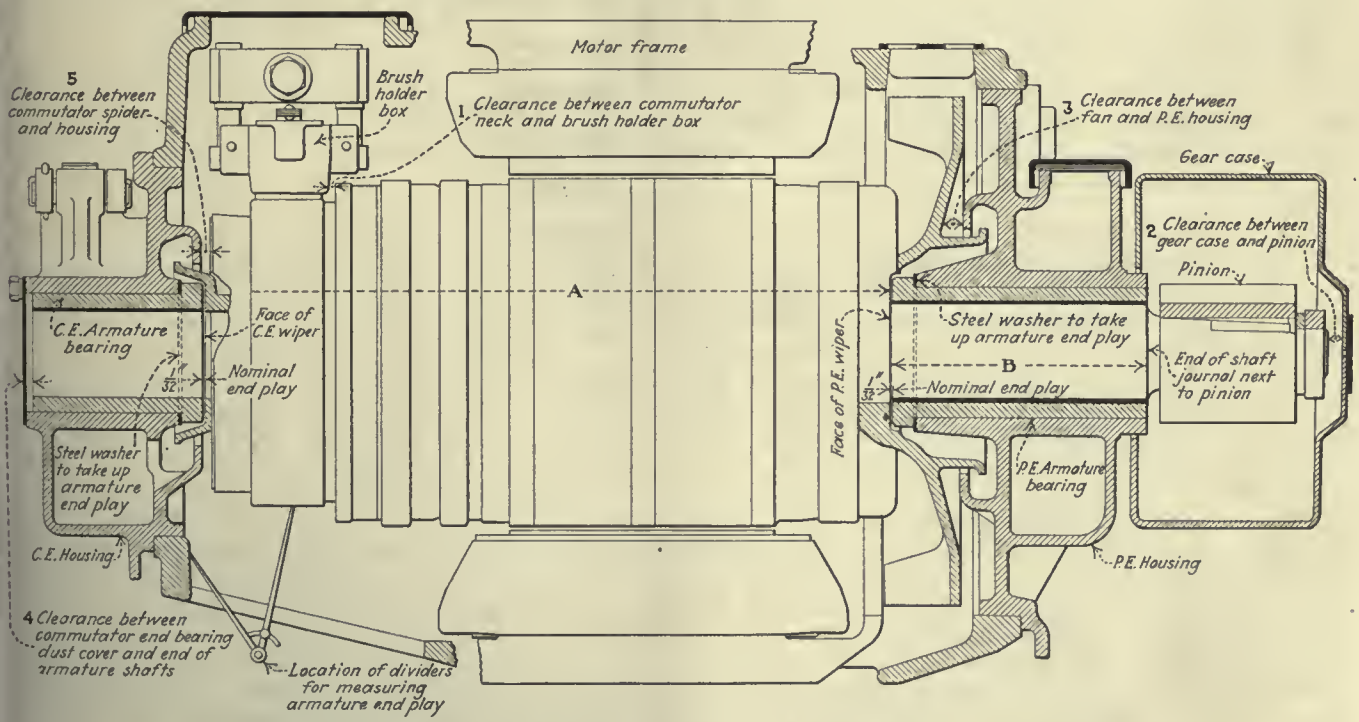
Compensating Armature End Play

Methods of Measuring and Compensating for Armature End Play Are Given, Together with the Solution of a Particular Problem

By Jesse M. Zimmerman
Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa.

OVERHAULED motors should not be put into service if the total armature end play is less than $\frac{1}{32}$ in. or more than $\frac{3}{32}$ in. The operator by careful study of each individual motor on his property can determine the maximum end play permissible for good operation. A simple method of measuring the end play of armatures as installed in their frames consists of moving the armature so that the pinion end wiper collar is against the armature bearing flange and then to prick punch a hole in the motor frame below the commutator. The various operations can best be followed by referring to the accompanying line cut. After prick punching, one point of a pair of dividers should be placed in this hole and a mark can be scratched on the commutator face with the other point. The armature should then be slid along so that the commutator end wiper collar is against the armature bearing flange. With the point of the dividers in the prick punch hole, another line can then be scribed on the commutator face. By measuring the distance between the two scribed lines, the total armature end play will be found.

Some general figures for armature end play should be of assistance. The end play for motors using gears with $3\frac{1}{2}$ to $4\frac{1}{4}$ diametral pitch should not exceed $\frac{5}{16}$ in., and the end play for motors using gears with $2\frac{1}{2}$ to 3 diametral pitch should not exceed $\frac{1}{4}$ in. Five particular clearance conditions should be taken into account on



Section of Railway Motor Showing How Armature End Play Can Be Determined

every motor. These are not all limiting conditions, but should be considered when arriving at the absolute maximum end play. These conditions are designated in the longitudinal drawing of the motor illustrated. The clearances are (1) between the commutator neck and brush-holder, (2) between the pinion and the gear case, (3) between the fan and pinion end housing, (4) between the commutator end bearing dust cover and the end of the armature shaft, and (5) between the commutator spider and the commutator end housing.

Steel Washers Found Useful to Take Up End Play

Fiber washers slipped over the armature shaft have been used to take up the armature end play in railway motors, but this method has not given entire satisfaction. On some properties, grit became embedded in the fiber and this caused wear at the bearing flange. In some instances, where the fiber washers had been in service for only a few months, they were badly worn or had entirely disappeared. In order to overcome the difficulty experienced with fiber washers, many operators are now using $\frac{1}{16}$-in. thick steel washers placed over the armature bearings between the flange and the housing hub.

EXAMPLE OF METHOD USED TO CALCULATE THICKNESS OF WASHERS NECESSARY TO TAKE UP ARMATURE END PLAY

[1]	
a. Wiper distance on new armature to be	22 11/16 in.
b. Wiper distance on old armature to be	22 5/8 in.
c. Total wear on wiper faces to be	1/16 in.
d. Measured dimension B	4 17/32 in.
Dimension B received from manufacturer	4 1/2 in.
e. Wear on P.E. wiper	1/32 in.
Since the total wiper face wear found in c is	1/16 in.
and the wear on the P.E. wiper is	1/32 in.
f. The wear on the C.E. wiper will be	1/32 in.
[2]	
New C. E. armature bearing flange	3/4 in.
Old C.E. armature bearing flange	21/32 in.
Wear on C.E. armature bearing flange	3/32 in.
C.E. wiper face wear	1/32 in.
Total end wear on the C.E. of the motor	1/8 in.
Therefore, two washers should be placed over the C.E. bearing	
[3]	
As in Par. 2, P.E. bearing flange wear	1/32 in.
P.E. wiper face wear	1/32 in.
Total wear on the P.E. of the motor	1/16 in.
Therefore, one washer should be placed over the P.E. bearing.	

It is necessary to know how many washers each $\frac{1}{16}$ in. thick are to be placed over the armature bearing before it is pressed into the housing. This can be taken care of by obtaining from the manufacturer the distance (A) between wiper faces for a new armature and the distance (B) between the pinion end wiper face and the end of the shaft journal next to the pinion. The distance between wiper faces for the armature to be used should then be determined. A convenient method of measuring the distance (A) between wiper faces of an armature was described in ELECTRIC RAILWAY JOURNAL for May 9, 1925; this method being used in the Utica Park shops of the New York State Railways. A similar method is illustrated herewith. The difference between the dimensions given by the manufacturer for a new armature and that obtained by measuring the armature to be used will be the total wear on the wiper faces. By measuring the distance (B) from the pinion end wiper face to the end of the shaft journal next to the pinion and subtracting this from the original dimension, the wear on the pinion end wiper face will be obtained. This wear on the pinion end wiper face subtracted from the total wear will give the wear on the commutator end wiper face.

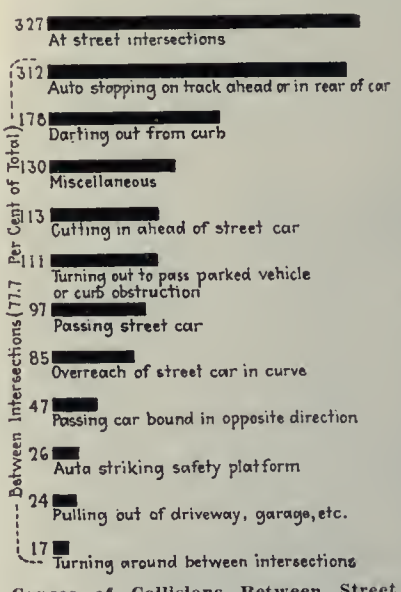
To find the wear on the commutator end bearing flange, add to this the wear on the commutator end wiper faces. This will be the thickness of the washers necessary to place over the commutator end armature bearing. The wear on the pinion end bearing flange can be found by adding to this wear the pinion end wiper face. This will be the thickness of the washers necessary to be placed over the pinion end of the armature bearing. In order to illustrate the various steps as just given, a practical example is worked out in the accompanying table.

In the example given in the table, it is not necessary to account for the allowable end play since the motor was designed for $\frac{1}{16}$ in. total end play. Therefore, by using the design values for wiper face, end distance and bearing flange width the same end play should be obtained.

It is necessary that the bearing flange be pressed tight against the housing hub to insure sufficient end play, and in applying washers care should be taken to make sure that the commutator neck does not strike the brush-holder.

Traffic Accident Causes Analyzed at Grand Rapids

AN ANALYSIS of the causes of automobile accidents in 1925, recently issued by the department of public safety, Grand Rapids, Mich., shows that of 11,574 vehicles involved, 8,582 were private automobiles, 1,313 were street cars, 883 were heavy commercial automobiles, 210 were light commercial, 203 were automobiles of other types, 149 were bicycles, 118 were taxicabs, 58 were motorcycles and 47 were passenger buses. Altogether there were 5,996 accidents. Of this number 3,826 were collisions between motor vehicles and 1,313 were collisions between automobiles and street cars. It was found that 86 per cent of the collisions between automobiles occurred at street intersections, while 78½ per cent of those between trolleys and automobiles occurred in the middle of the block. Pulling away from curbs, trying to get ahead of street cars through narrow spaces, stopping suddenly in front of cars or failure to notice the stopping of cars were the reasons for most of these accidents. A graphic comparison of the number of street car-automobile collisions resulting from each of these causes is given in an accompanying chart.



Causes of Collisions Between Street Cars and Automobiles in Grand Rapids



Combination Shop and Carhouse of the Aurora, Elgin & Fox River Electric Company Has a Steel Skeleton on Concrete Foundations with Brick Walls and a Wood Plank Roof

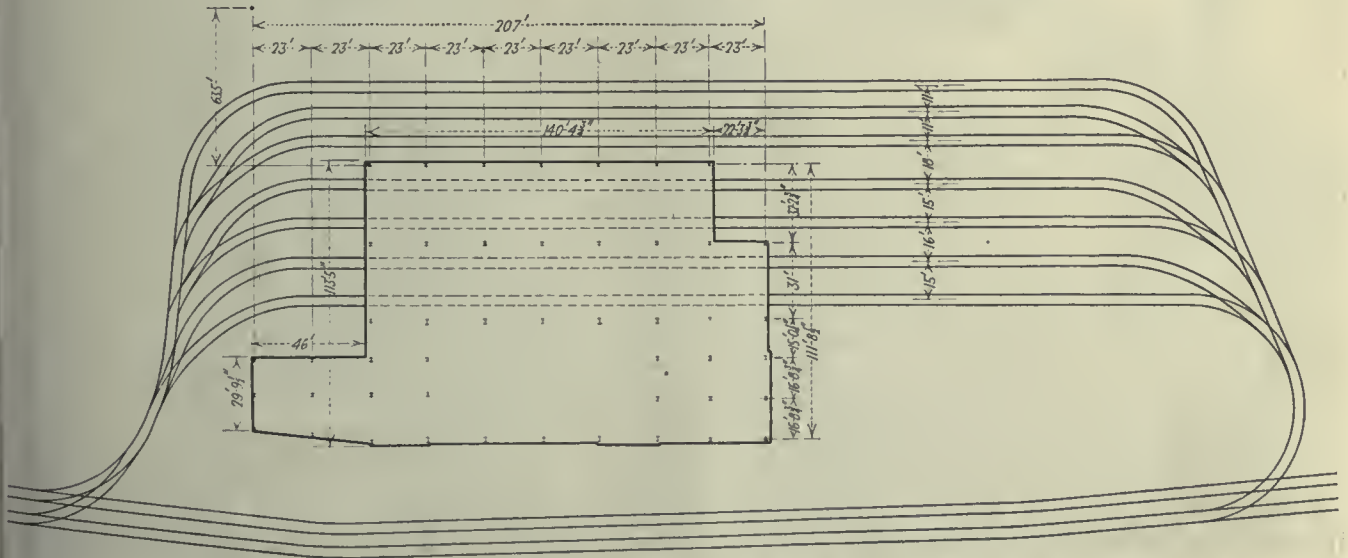
New Shops Built for Fox River Line

Roomy and Well-Lighted Structure at Aurora Is Used for All Major Repairs, Overhauling and Car Painting Work of This Railway—Machine Tools Are Provided with Individual Drive

By Bruce Vernon
Division of Construction & Engineering, Stone & Webster, Inc.

CONSTRUCTION of a new bridge across the Fox River at Aurora, Ill., and a consequent change of 5 ft. in street grade recently necessitated the abandonment of the old carhouse and shops of the Aurora, Elgin & Fox River Electric Company. A new shop and carhouse was designed and constructed during 1925 by the division of construction and engineering, Stone & Webster, Inc. While the old structure was on the east bank, the site selected for the new building was on the west bank of the Fox River at River and First Streets, about ¾ mile south of the old carhouse. This change in location has resulted in giving the railway much improved facilities.

The main building is 113 ft. wide by 209 ft. long, with a two-story section at the north end 35 ft. wide by 46 ft. long which is used for trainmen's quarters. Provision has been made for the extension of the building east and south. The building is constructed with a



Track Layout and Building Arrangement of New Combination Repair Shop and Carhouse at Aurora



Flooring Has Been Omitted Between the Tracks in the Inspection Shed to Give an Unobstructed View of the Trucks and Underbodies



Materials Are Handled in the Machine Shop by a 5-Ton Electric Crane Operated from the Floor

steel frame, concrete foundations, brick walls and a wood plank roof. Floors are of concrete, except in the machine shop and carpenter shop, where wood block has been used. Flooring was omitted between the tracks in the inspection shed to allow for unobstructed view of the trucks and underbodies of the cars.

Large track doors at the north and south ends of the building are of wood, 13 ft. wide by 16 ft. high, and of the jack-knife type. Rolling steel doors are provided between the paint shop and the machine shop. Ample light is admitted through large windows with rolled steel frames on the east and west sides of the building, three sawtooth monitors in the center portion of the building and skylights over the machine shop and armature repair room.

Shops and carhouse are heated with four indirect unit heaters and the trainmen's quarters and armature repair shop by direct radiation. In addition to the floor unit heaters, a warm air heating system was installed in the pits to dry the underside of the cars during the winter season. The unit heating system has been in operation during cold weather and has proved very satisfactory. Steam for heating is supplied from a power plant near the carhouse.

The master mechanic's office is located on a mezzanine floor in the north end of the machine shop, where he has an unobstructed view of the shop and inspection shed.

The building is equipped with roof sprinklers throughout. Fire hydrants are located in the outside car storage yard. Separate toilets and locker rooms are provided for trainmen and shopmen. The locker rooms are equipped with showers. An open floor drainage system was installed, draining into sumps and covered with grating to allow for cleaning. A spray car washing system is provided for washing cars.

The main storeroom of the railway company is located across River Street from the carhouse and the shop storeroom is used for auxiliary stores.

On the west side along River Street are located the machine, blacksmith, welding and carpenter shops, with a mezzanine floor at the south end of the building for repairing of armatures and controllers. The two tracks adjacent to the machine shop are used for body and truck repairs. South of the machine shop is located the paint shop. The railway operates motor buses, which will also be painted in that shop. The two east tracks are for car inspection and washing.

Modern Equipment Provided for Machine Shop

Machine shop equipment consists of a 200-ton wheel press, a 36-in. engine lathe, a 20-in. lathe, shaper, radial drill, 24-in. drill, hacksaw, emery grinder, forge and air compressor. Provision has been made for the future installation of a wheel lathe in the machine shop near the wheel press. In the carpenter shop a rip saw and combination wood-working tool are installed. The armature shop equipment consists of a 22-in. lathe and a banding machine. Some of the equipment was removed from the old carhouse and additional equipment was purchased. Wherever possible, all tools were provided with individual drive.

Materials are handled in the machine shop by a 5-ton electric floor operated traveling crane. Air monorail hoists were provided over the tracks used for body and truck repairs for raising car bodies from the trucks. Armature and wheel changes are handled by an air pit jack mounted on flat wheels, by which they are moved to the south end of the pit, where a jib crane is used to raise them to the machine shop floor. This jib crane was also designed to swing a complete car truck from the car tracks to the wheel storage tracks. For raising armatures and controllers to the mezzanine floor an electric hoist was provided.

The carhouse was designed with track connections from River Street to each end of the carhouse. Approximately 90 cars are operated from the carhouse. The repair shop is used for all major repairs, overhauling and painting of cars from both Aurora and Elgin. Storage tracks on the east and south sides of the building are used for open storage, and for a property of the size of the Aurora, Elgin & Fox River Electric Company the open storage for cars is thought to be quite satisfactory.

Pittsburgh Railways the Big Brother of Invention

IF NECESSITY is the mother of invention, then suggestion might well be called the brother of invention. The Pittsburgh Railways is acting like a big brother to its fraternity of employees, in that it is rewarding them for bringing in suggestions. These ideas have not only proved valuable as savers of time and money, but the freedom of thought allowed has been a stimulus leading in many cases to invention of devices.

Ideas are forwarded to a department of the Philadelphia Company, of which the Pittsburgh Railways is a subsidiary, known as the suggestion department. This body encourages the making of suggestions by employees on any subject. There is a committee that reviews all suggestions after submission to department heads. It decides whether or not the suggestions should be adopted, and sets the value on the suggestion, cash prizes being granted in amounts anywhere from $5 to $75.

The way the plan works out in practice is well illustrated by the following incident, which is typical of what can be accomplished. On Jan. 21 a letter was received by the suggestion department from one of the shop men, signed "A Dynamic J.," a fictitious name, of course. But the real name was not lost sight of, nor was the idea, because a few weeks later a reply was sent, inclosing a voucher for $50.

These letters will tell the story:

Date, 1-21-26.

WILLIAM A. COYLE,
Chairman Committee on Suggestions.
DEAR SIR:

The car-wheel boring machines at Homewood Shops (P. R. Co.) have individual motor and gear drive with ordinary control equipment. When the operator wishes to shut down the machine, in order to change the tool setting, gage, the bore, or remove the work, he must wait until the table on which the wheel rests stops rotating. At present the wheel will rotate about nine revolutions after the power has been shut off. This rotation is slow and cannot be stopped by ordinary manual means, due to the great weight of the rotating table and revolving armature. Much time is lost by the operator and machine in waiting for the table to stop. This loss is considerable on account of the frequent stops which are necessary.

I would suggest that a dynamic brake be applied to the machine, to overcome this fault. This device is simple and functions in stopping the machine. It will stop the rotation of the table in less than a quarter of a revolution after throwing the switch. This is accomplished by the *dynamic braking* of the motor. The total cost of this device is estimated at less than $5 each.

In addition to saving considerable time, it has the advantage of being a safety device. Should the operator's clothes become entangled in the revolving table, the machine can be stopped before serious injury results.

This can be applied to any motor-driven machine.

Fictitious Name, A DYNAMIC J.

March 17, 1926.

INSTALLATION OF DYNAMIC BRAKE ON CAR WHEEL BORING MACHINES AT HOMEWOOD SHOP

DEAR MR. LUDWIG:

Thank you very kindly for your letter offering suggestion relative to the above subject.

The committee referred your idea to Mr. T. Fitzgerald, vice-president of the Pittsburgh Railways Company, who informs us that your idea will be adopted. It will save time and also prevent accidents.

It is a pleasure to inform you that the committee, at its last meeting, decided to give you an award of $50, voucher for which is attached.

May we have other of your ideas?

Sincerely yours,

Chairman.

MR. ALBERT J. LUDWIG,
Homewood Shop.

Copy to Personnel Department.

Leather Upholstered Seats in Regular Cars Prove Popular in Cleveland

MUCH talk about the desirability of comfortable seats caused a recent experiment on the part of the Cleveland Railway. Its standard two-car trains have a combination of cross and longitudinal seats in the motor car and all longitudinal seats in the trailer. One of these trains was stripped of all seats. After refinishing the interior, comfortable leather-upholstered, bucket type seats were installed, as shown in the views. The seats have full spring construction covered with loose padded leather seat cushions. The backs are shaped to give the sense of an individual seat.

The interest shown by the public was a source of astonishment to the management. People inquire daily



Looking Forward in a Standard Trailer Used in Cleveland, Showing Seating Arrangement

of inspectors and trainmen when the car with the comfortable seats is due to pass their corner and the telephone operators at the company's switchboard frequently have calls of a similar nature.

All of the new seats face forward. In the rear of the motor car the seats are placed two and two across the car. Where more space is desirable the aisle is made wider by using only single seats on one side.

Seating capacity is not materially changed by this new plan, largely because the old trailer seating was not so very economical. In the new arrangement 48 seats replace 56 of the old type, while in the trailers 60 of the bucket type seats are used instead of 57 or 58 of the old type (depending upon the use of a stove or electric heat in winter). For the whole train only five less seats of the new type are provided, but the comfort and desirability of the seats from the ride-selling standpoint are many times as great.



The New Seats in Cleveland Experimental Train Are an Invitation to Come in and Ride



In the Cleveland Experiment with Comfortable Seats of the Luxurious Bus Type All Passengers Face the Front



Bucket Type Leather-Upholstered Seats Being Tried on One Two-Car Train of the Cleveland Railway Have Proved Very Popular

Improved Instrument for Car Operation Tests

By A. W. Swan, B.A.Sc.
Evershed & Vignoles, Ltd., London, England

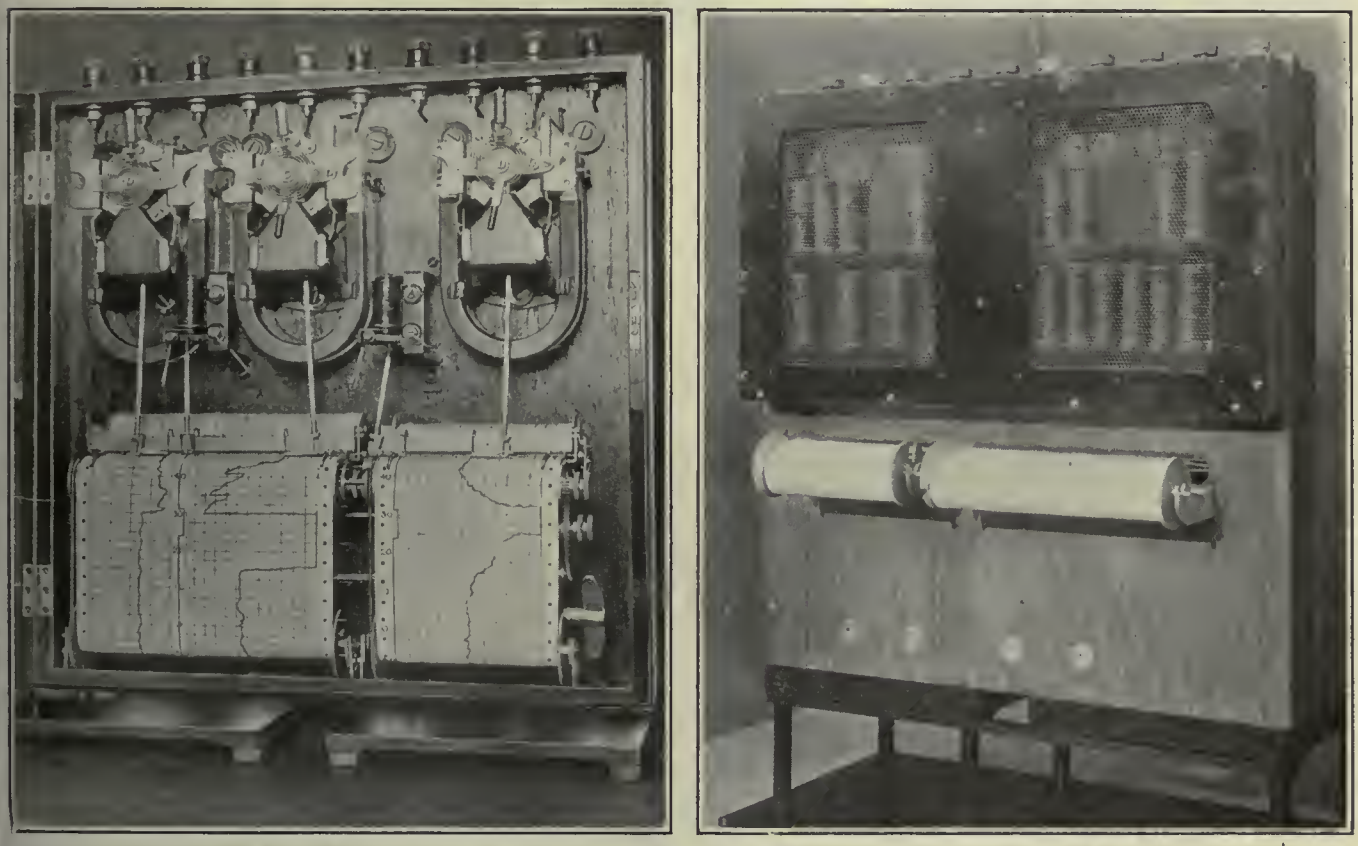
INTERRELATED records arranged side by side to show speed, current, volts, stopping time, and brake applications are particularly desirable to electric railway test engineers. To supply this need a comprehensive instrument, called the traction recorder, has been placed on the market by Evershed & Vignoles, Ltd., London, England. A short description of this instrument was published in ELECTRIC RAILWAY JOURNAL for March 7, 1925. Since that time, however, a number of improvements have been made as the result of the practical use of this instrument, particularly in tests made by the Metropolitan Railway, London.

The recorder shown herewith was designed specifically for use on electric railways which employ direct current. The design, however, can be readily modified for use on either single-phase or three-phase systems. For electric railways using alternating current, records would be shown for current, voltage, and power relating to true kilowatts, wattless component, power factor, etc. The instrument is portable and can be transferred readily from one location to another. However, to insure steady recording when a car or train is traveling at high speed it is necessary to have the instrument fixed in some semi-permanent position.

The traction recorder, as improved, charts five individual records. These are: (1) Line voltage; (2) station stops; (3) total current; (4) brake applications; (5) speed in miles per hour. All records are in perfect synchronism, so that the charts are readily comparable. The time lines are straight, so that the values of current, voltage and speed at any particular instant can be compared readily. Particular attention has been given to produce an instrument which is not affected by train vibration or by external electrical and magnetic forces. Accuracy of the records produced has been considered as of greatest importance.

The recorder as arranged for direct-current railways is 20 in. x 20 in. x 8 in. in size and can be mounted in any convenient location in an electric car or locomotive. An accompanying illustration shows the instrument. It will be seen that the five records are produced on two rolls of cross-section paper. These are driven in synchronism and the perforations along the edge are arranged so that the records readily can be lined up for comparison. The individual records are produced by five pens which hang vertically from their supporting mechanism.

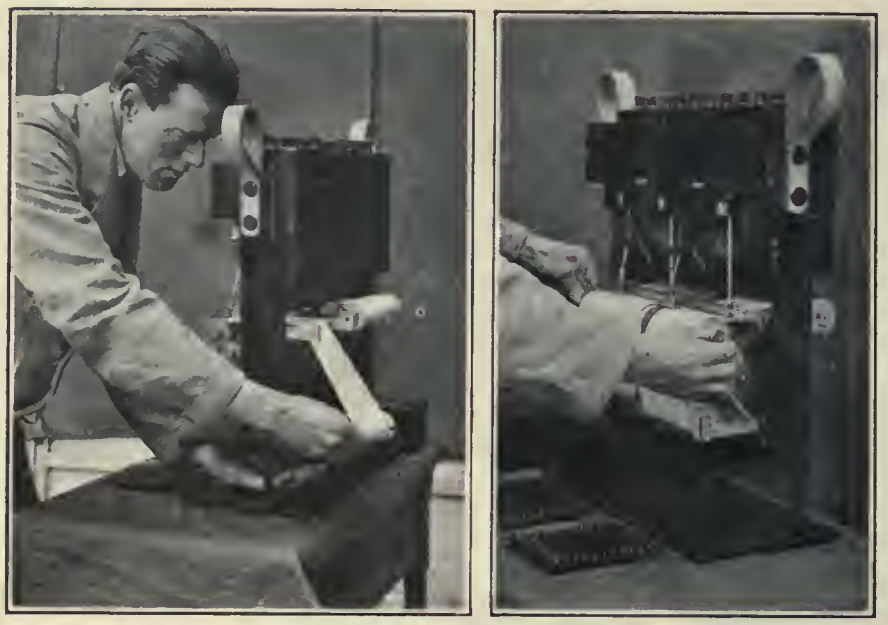
The records shown in the illustration, reading from left to right, are: Voltage, brake applications, current, station stops, and speed. The pens recording brake applications and station stops are operated by small electro-magnetic movements, while the three pens recording speed, current and voltage are controlled by instrument movements of the Evershed moving coil, moving iron, dynamometer, or ratiometer type, suitably shielded from external magnetic fields.



Front and Rear Views of Traction Recorder, as Arranged to Provide Five Simultaneous Records

The pens are designed to trace their records on a horizontal surface, and they are therefore always in contact with the chart paper even when the train is passing over switches or around curves. In order to minimize the effect of train vibration, the movements are balanced and heavily damped. Special non-spilling dashpots are also provided.

The success in neutralizing the effect of train vibration may be seen from a study of the chart reproduced herewith, which is a small section of a record taken by



Attaching the End of a Used Chart to a New Roll for Continuing the Record

engineers of the Metropolitan Railway, London. Recording on a chart 3½ in. wide, the maximum error due to train vibration was less than 1/64 in. when the train was traveling at 73 m.p.h. through a junction and over crossovers.

The chart speed can be varied from 1 in. to 12 in. per minute by changing the driving gears. The chart reproduced was made at a chart speed of 3 in. per minute, and the section reproduced is for a run between Neasden and Kilburn. This particular section was selected in order to show several short runs and not to illustrate characteristics of train operation or schedule requirements. The vertical lines on the original chart are 1 in. apart, and as the roll for this particular test was moving 3 in. per minute, the vertical lines represent time intervals of twenty seconds. These have been reduced in the illustration. The train on which this record was taken was a local, made up of two motor coaches and five trailers.

In the test referred to, one-half of the passenger space inside a motor car was fitted out as a testing compartment, a temporary wooden partition being placed across the car. The recorder was attached to the partition, and also rested on a table which was used for convenience of the operating staff. In addition to the recorder, a portable ammeter and voltmeter were used to take readings from time to time as a check on the figures of the recorder. An air gage and mechanism for controlling the brake record also were provided. Spare parts and other testing accessories, such as stop watches, log books, etc., were carried in two drawers fitted to the table. The speed record was obtained electrically from a small generator driven by one of the car axles. In order to compensate for different wheel diameters, as might be caused by wear, a wheel diameter compensator was used.

Provision is made so that a chart can be renewed without stopping the instrument. A spool of unused charts is carried on brackets mounted outside the back of the instrument. This can be fed through a slot. When it is seen that the used chart is nearing its end, it is unrolled and passed under the instrument, where it is pasted to the new roll. The new roll is then passed back under the instrument and put into the regular bracket. In order to insure that the registration of the double-peg drive is continuous, the joining of the two rolls is made on a special board with pegs on both sides corresponding to the actual drive. With such a board, the operation of pasting together the two ends can be done very accurately and quickly.

Another improvement consists of a prolonged metal surface underneath the chart. This permits making pencil notes on the records as the instrument is running. Loose flanges are also provided on the bottom spool, so that the paper can be slipped off quickly.

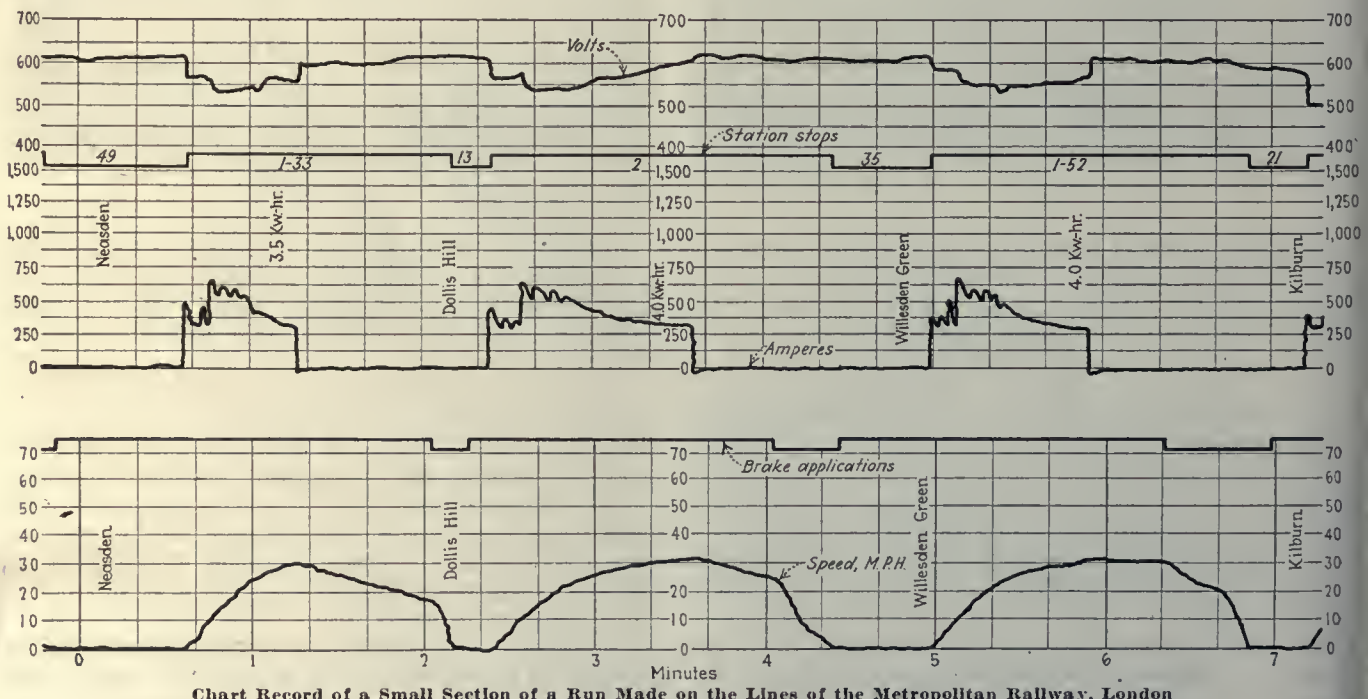


Chart Record of a Small Section of a Run Made on the Lines of the Metropolitan Railway, London

Dick Prescott Sees the Boss

and Makes a Recommendation



DICK PRESCOTT, engineer of equipment of the Consolidated Railway & Light Company, and his friend Steve White, the carpenter shop foreman, spent several busy evenings discussing the maintenance of old cars and preparing estimates on the costs for the various types of cars in service on the property. They were seriously handicapped by the lack of operating and maintenance cost records for different groups of cars. They did manage, however, to make up estimates for the older groups in comparison with cars bought in recent years. Their primary purpose was to find whether the expensive reconstruction work that was being carried out in the shop on the old equipment was justified.

When they had put their figures together Steve and Dick decided to lay them before Thomas Mullaney, general foreman.

Under the changed conditions in the Consolidated organization they felt sure the boss would welcome their suggestions and would give them a hearing. This was indeed a new order of things in the shop. A year before no one would have dared make such a report to Mullaney. But the word had gone down the line that the property was being operated to make money and not to save it. Along with this had gone the idea that the only way to make money was to make the company's service worth money—enough money to show a profit at the end of the year. Department heads who had formerly been under constant pressure to hold down their expenses were now being pushed for new suggestions on how to improve the company's service with a view toward building riding on its cars and making its patrons into friends and boosters.

Mullaney was an entirely changed man under the new conditions. The old defensive hard shell with which he had formerly protected the precedents of past years was almost entirely gone as the result of the need for stimulating interest and constructive thinking among the members of the shop staff.

When Dick and Steve entered his office, Mullaney looked up with a twinkle of interest in his eyes as he inquired the purpose of their visit in his usual gruff manner.

"Well, what have you fellows got on your mind now?" he asked.

"Steve and I have been doing some figuring during the past week or so," replied Dick, "and we've got some information put together here that we think you will want to have."

"Figuring about what?" queried Mullaney.

"Car maintenance costs," replied Dick.

"What do you fellows need to be figuring on that for? I've got all the records right here from the auditor."

"We realize that, Mr. Mullaney. We haven't been fooling with maintenance costs per car mile for the department. That's a matter of checking total expenditures and determining the total amounts spent for labor, material and other principal items. We've been trying to get at a comparison between the different types of equipment."

"Well, I don't even see what you've got to do there. I've got mileage records on armature rewinds, pull-ins, bearings, gears, wheels and other items. We keep figures on oil consumption, glass, trolley wheels and lots of other things. We know more about those items right here in the office than you men could ever dig out in a year."

"That's true, Mr. Mullaney, but what we were after was the comparison of different types of equipment."

"All right, we've got that too. We've made tests right along to check up on how each manufacturer's stuff stands up, particularly when we get anything new to try out."

"Yes, I'm following all those records in the engineering department, Mr. Mullaney, and I am also carrying some of those tests further. But Steve and I have been going after another and a very important side of this story. We're trying to get a comparison between the total operating and maintenance costs on some of the older equipment, like the group of 200 class cars for example, and on the newer light-weight cars that we put in service several years ago. We've tried to find out whether or not it would be better to scrap the old 200s and buy new cars with modern improvements than to spend $2,200 apiece on them for rebuilding, as we're doing right now."

"Oh, that's what you fellows are driving at, eh? Well, what have you got?"

"We've got some estimates that look very interesting," said Dick, as he handed Mullaney a copy of the report that he and Steve had prepared.

Mullaney glanced through the report, while Dick and Steve sat by in silence.

"Huh!" he finally exclaimed. "You think we ought to get rid of the 200s instead of rebuilding them, and buy some new cars in place of them?"

"It looks very much that way," answered Dick.

"That sounds all right, but where do you think we're goin' to get the money?"

Dick was ready for the question. "The amount we're spending on the 200s right now is more than half the first payment cost on the same number of new cars," he responded. "We figured that it would only be necessary to raise as much more as we're now spending, and that the saving in operating and maintenance alone would more than pay off the entire cost of the cars."

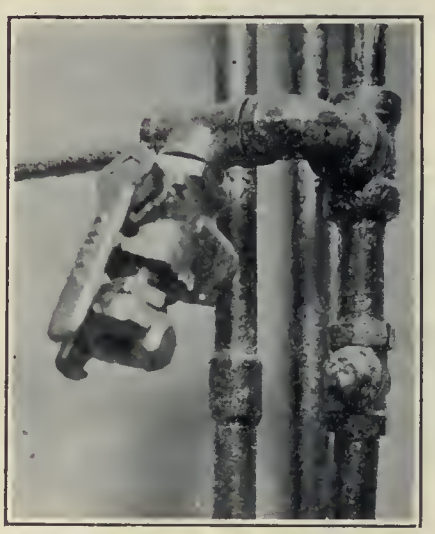
"If that's so," replied Mullaney, "it looks to me as though you fellows had something here that we ought to be thinking about. How did you get at your figures?"

Maintenance Notes

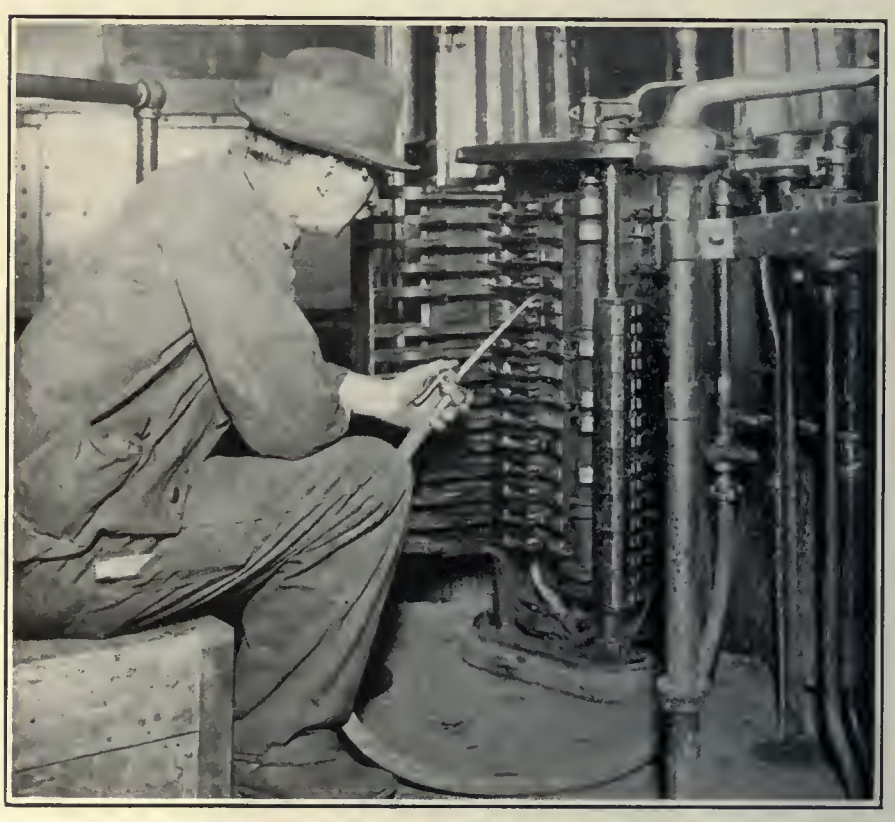
Convenient Attachment for Blowing Out Controllers

CLEANING and blowing out controllers is considered a most essential part of the inspection of car equipment in the shops of the Department of Street Railways, Detroit, Mich. To provide a convenient method for attaching the air hose and also to eliminate the necessity of having the workman handle a long line of hose for this work, each car has been equipped with a shut-off valve in the main reservoir line alongside each controller. These valves and the end of the hose are provided with Universal air hose couplings, so that the hose can be attached very quickly.

To blow out a controller, the workman attaches a length of approximately 5 ft. of hose to the coupling alongside the controller. This hose has a special fitting at the end, with a long tapering nozzle, so that the air can be directed in an effective manner. The nozzle is also provided with a valve so that the air supply can be regulated as it is used. The accompanying illustrations show the hose attached and nozzle for blowing out a controller, and also a close-up view of the Universal fitting for attaching the hose.



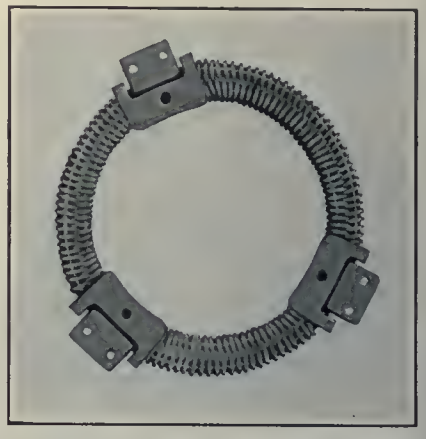
Close-Up View of the Air Valve and Universal Fitting for Attaching Hose to Blow Out Controllers



Removing Carbonization and Dust from a Controller by Air Blast on One of the Cars of the Department of Street Railways, Detroit, Mich.

Rope-Laced Compressor Suspension Used

NOISE of air compressors has been reduced by a special suspension in a trial made by the Buffalo & Erie Railway, Fredonia, N. Y. This suspension, which consists of two circular rods laced together with specially treated trolley rope, has reduced the noise of compressors transmitted to the car body about 80 per cent. The type of compressor suspension illustrated is for the General Electric Company's type CP 27-S compressor. The suspension consists of two circular 1-in. rods with supporting lugs welded onto them. The outer ring has three lugs which bolt to the car body. The inner ring has three lugs which bolt to the compressor housing. Safety lugs are also provided on the center ring at each point of support which extend out over the outside ring with sufficient space between them and the ring to allow for the rope lacing.



A Noiseproof Compressor Suspension Is Obtained by Lacing Two Rings Together with Trolley Rope, the Inner One Serving as a Support for the Compressor, While the Outer Ring Is Fastened to the Car

The two rings are laced together tightly with ordinary trolley rope which is treated with linseed oil and paraffin, so that it will not deteriorate from exposure to the weather. Before the rope is attached, the rods are taped so as to do away with any tendency to cut the rope from contact with the rod. With this type of suspension, the air connections to

the compressor are made through rubber hose.

The management of the road states that the flexible compressor suspension eliminates almost entirely the more pronounced and objectionable noises created by the running of the compressor. These were most objectionable when the car was running at low speed or standing still. The effect of the improvement has a decided bearing on passengers and their general comfort, aside from the elimination of noise in the moving equipment on the highway.

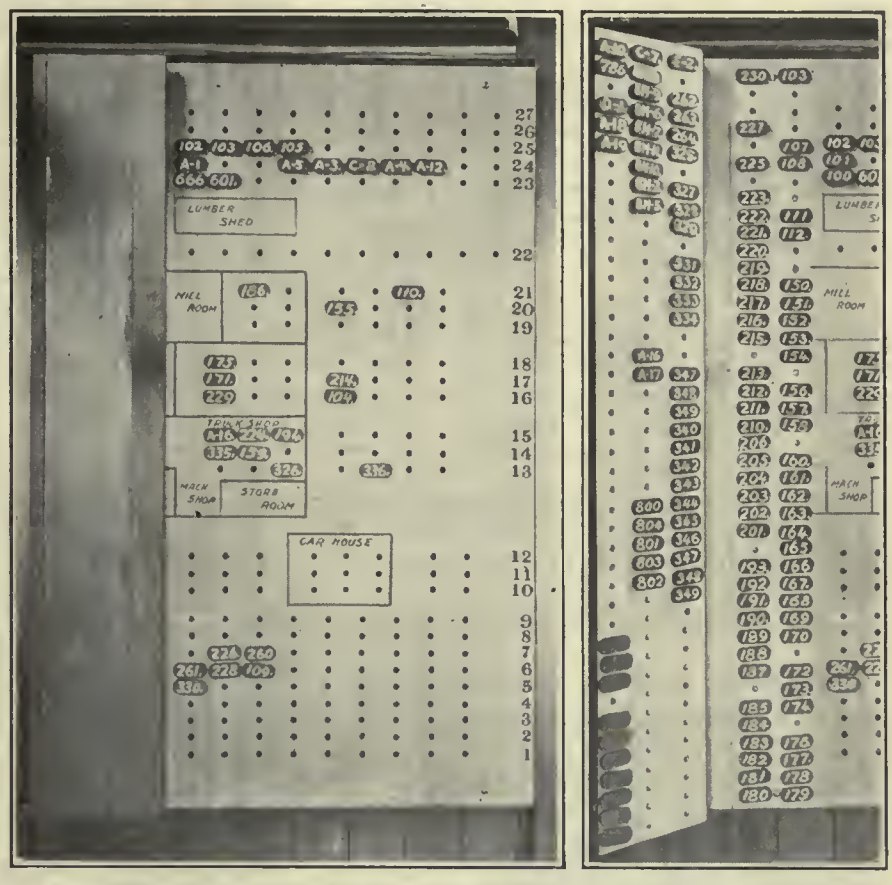
Dust Washed from Air After Cleaning Armatures

MANY electric railway shops are provided with special facilities for blowing the dust from armatures and other electrical equipment preparatory to rewinding or repairing. The Los Angeles Railway, Los Angeles, Cal., however, has added another improvement in that the air as it is drawn out from the cleaning compartment passes through a tank containing an arrangement of pipes for spraying water. This washes the air clean before it is once more returned to the outdoors.

The equipment provided in the Los Angeles shop consists of a special compartment in which armatures, motors and like equipment are cleaned. The electric parts are suspended from an iron rod and the compartment is completely closed except for a small aperture through which the cleaning nozzle is inserted. Air and dust after removal from the equipment are drawn out by an exhaust fan.

Board Shows Location of Cars

DIRECTLY in front of the desk of the superintendent of equipment of the Erie Railways, Erie, Pa., is a large board arranged to show the location of all cars which are in the shops or adjacent storage yards. This board is made up twice a day, so as to make certain that it represents conditions as they change. It consists essentially of a layout of the shop and tracks, with holes arranged at the correct intervals along the center lines of the tracks so that small wooden blocks can be inserted to represent the cars. These blocks have car numbers painted on them, so that when the board is made up it shows the location and number of each car. The tracks are numbered from 1 to 27, beginning at the bottom of the board. The first nine tracks are in the storage yards. Tracks 10, 11 and 12 go through the carhouse, tracks 13, 14 and 15 into the truck shop, 16, 17 and 18 into the carpenter shop, 19, 20 and 21 into the paint shop; track 22 is between the paint shop and lumber shed, and tracks 23, 24, 25, 26 and 27 in the yard adjacent to the lumber shed. The left-hand edge of the board has a hinged cover with space for keeping the blocks representing cars which are in service or at other points of the system. The board is 44 in. high and 30 in. wide. The left-hand side door is 7 in. wide.



This Board Has Been Found Particularly Convenient for Keeping the Master Mechanic Informed as to the Location of Cars in the Shop
At left, board as it appears normally. At right, with hinged cover open.

Painting Destination Signs with Roller and Mask

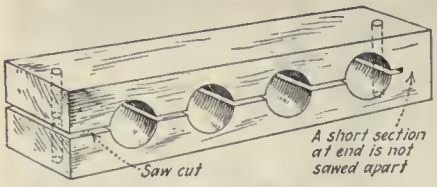
NOT long ago an acknowledged expert in the painting of destination signs by the spray process challenged one of the International Railway (Buffalo, N. Y.) sign painters, who favored the roller and mask method, to a race. The latter won a decisive victory, as he was able to turn out the curtains at a normal rate of one every five minutes and, furthermore, the finished product was a thing of neatness and beauty, which could not be said for the product of the challenger.

The I. R. C. method is to place a mask on the linen curtain, which is Sun-Fast Holland heavy linen, then after tacking the curtain and mask firmly in position, the inked roller is passed back and forth across the whole until the entire curtain is completed. Roller signs of indefinite length may be made in this fashion, as the completed portions are simply moved on out of the way and further sections inked.

Impregnated Motor Cleats Prevent Short Circuits

CLEATS for holding motor leads are commonly made of hard wood. When these become water soaked the insulation resistance between leads is decreased considerably and sometimes short circuits result. The wood also rots quickly.

To keep water out of such cleats the Department of Street Railways, Detroit, drys out the new cleats in a baking oven and, while still hot, soaks them in linseed oil. Increased life and decreased trouble have resulted. In making the cleats, holes



Hard Wood Motor Lead Cleats Are Impregnated to Keep Out Moisture in Detroit

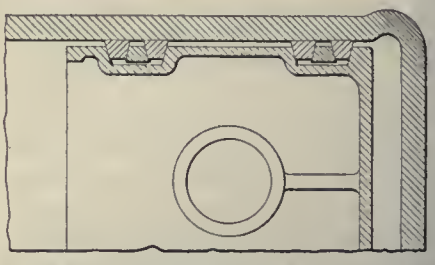
are drilled of proper size to fit the leads. The blocks are then sawed through the center line of the holes. A short section at the end is left unsawed so that the two parts are kept together until ready for installation.

Disk Grinding of Motorman's Valves Saves Time

FOR grinding in motorman's valves, the Erie Railways, Erie, Pa., makes use of a cast iron disk ¾ in. thick by 12 in. diameter, attached to a compressor motor. When grinding valves a carborundum paste is spread over the valve seat, which is then held against the side of the rotating disk. This method has proved entirely satisfactory and the time and the labor of grinding have been reduced enormously.

Bus Engine Piston with New Type Rings

PISTON rings of the conventional type used with automotive equipment are of one piece, step-cut, and are placed in a straight groove. With the ordinary type of piston, the cylinder walls, after long usage, become worn out of round, because the pressure of the connecting rods caused by the rapid revolving of the crankshaft forces the pistons against the cylinder walls. The piston rings, too, wear thinner, and as they do they become weaker, losing their pressure against the cylinder wall. In addition, the grooves wear also, so that sooner or later the motor develops what is known as "piston slap" and becomes noisy. Because of the loose-fitting rings, power is diminished and gas and oil consumption increase rapidly. Heretofore the only effective remedy for such trouble has been to take the motor down and send the block to a regrinding shop, where the cylinders are rebored and fitted with oversize pistons and rings. This method is expensive



A Three-Piece Ring Guides the Piston and Eliminates Slap

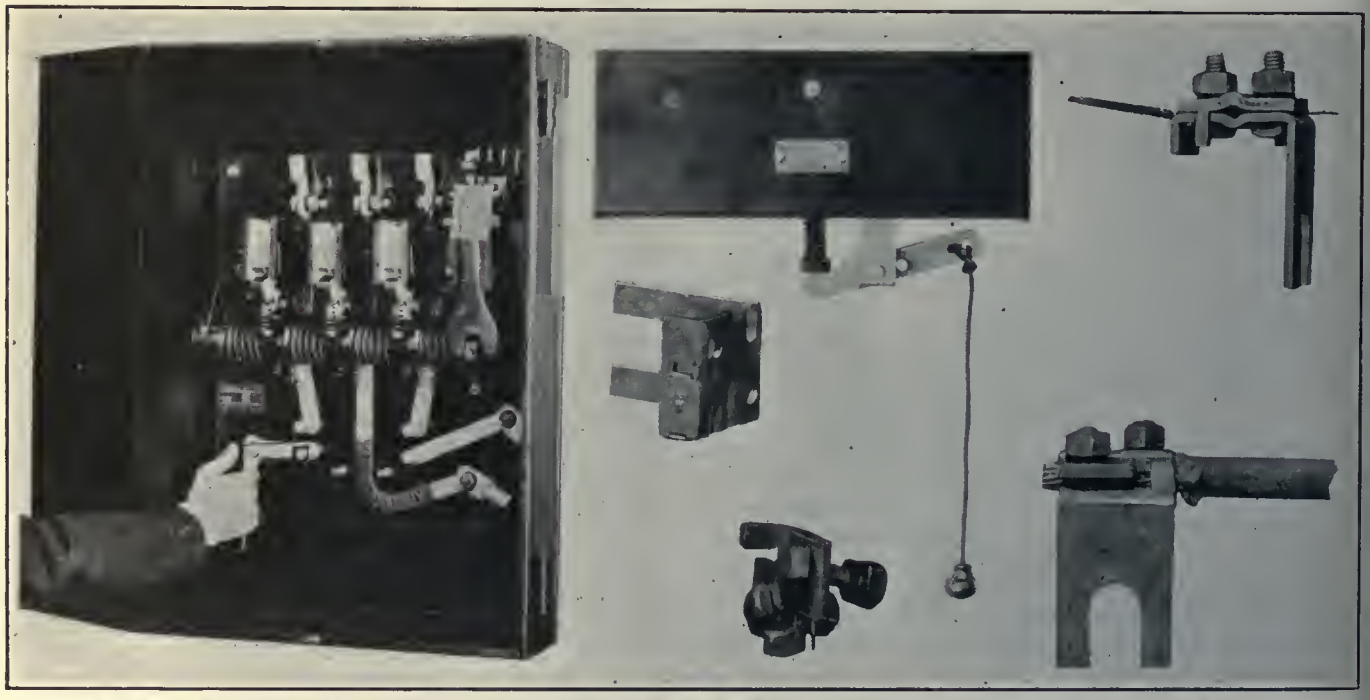
New Equipment Available

Improved Control Accessories Facilitate Installation

RECENT control devices marketed by the General Electric Company, Schenectady, N. Y., include a resistor terminal, an external relay reset, a relay installing wrench and a relay mounting panel. With the exception of the resistor terminal, the new equipment is designed to facilitate the use of temperature overload relays. The improved terminal simplifies installation of resistors. Only one size is needed for all currents up to 225 amp. Soldering is unnecessary to secure stranded cable and the mechanical construction is improved so that changing taps is simplified.

For use with those control installations where starters do not incorporate temperature overload relays, temperature overload protection may now be secured by using a new design of auxiliary panel on which a temperature overload relay may be mounted. It is equipped with a novel resetting feature, which allows external resetting by means of a cord.

A special installing wrench for mounting relays in those panels and switches which do not contain them has been designed and is delivered as part of the control equipment with which they are needed. With this wrench the danger of damage to the thermostatic strips while installing is minimized.



At Left, Relay Installing Wrench. At Top, Center, External Resetting Device. At Right, New Terminal for Resistors

and at best is only temporary, for in the majority of cases there is a recurrence of the old troubles.

To provide a remedy for such conditions experiments have been conducted and the "Anti-Slap" piston with specially designed rings has been developed by the Anti-Slap Piston Company, Rahway, N. J. This piston has two beveled-edge grooves, one near the top and one in the skirt. Each groove is fitted with a three-piece ring, two pieces of which bear against the cylinder wall. The outer rings are beveled on both sides, to fit against the beveled groove in the piston and the bevel of the center ring. The wall pressure of the outside rings is small, but the outward pressure in the center ring forces them against the beveled edges of the groove in the piston and against the cylinder wall.

The center ring does not come in contact with the cylinder wall, does



Piston with Specially Designed Rings

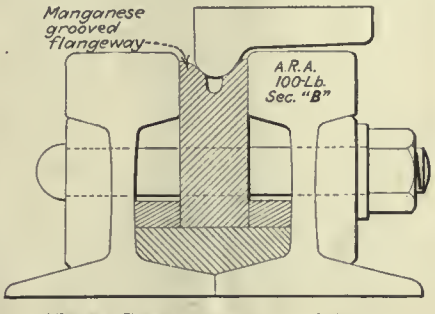
not wear away and constantly retains its pressure. The break in the center ring is at right angles to those of the outer rings. This causes the inner ring to exert its greatest pressure against the outer rings at their joints, forcing the outside rings to conform to the cylinder bore and have a tight bearing against the beveled edges of the piston grooves. This action of the rings guides the piston and eliminates piston slap.

With the use of "Anti-Slap" pistons it is claimed motors will run more quietly and smoothly; oil cannot work past the rings to foul the spark plugs, thus reducing oil consumption; gasoline consumption is reduced because of the more tightly fitting rings and more power is obtained, making the engine more efficient in its operation.

Track Crossing Has Manganese Filler

SPECIALLY designed for surface street car lines, the Wiswell improved crossing embodies an ordinary built-up rail crossing to which certain patented improvements have been added. These consist of a cast manganese filler and grooved flangeway said to eliminate all jumps and pounding at intersections.

It is claimed that all wear on the extreme tip of the wheel flange is eliminated by means of the U-shaped groove which is shown in the accompanying illustration. The wheels are



Flange Bears Evenly on U-Groove

carried in the saddle of the flangeway and ample bearing is provided on both sides of the flange, allowing no weight whatever to come on the point or tip. The U-groove shown at the bottom of the flangeway protects the edge of the wheel from being chipped or broken, according to the manufacturer.

With the usual single point bearing, where the wheel bears on the extreme tip of the flange the top of the flangeway is rapidly cut down where chilled cast-iron wheels are used. Where cast-steel wheels are used the flange itself becomes flattened, and as a result the special work may become badly pounded. It is claimed for the Wiswell crossing that the absence of movable parts and the ease of replacement of the manganese flangeway reduce maintenance work to a minimum.

When the flangeway is worn down $\frac{1}{8}$ in., it is stated that this can be raised by simply removing the bolt and placing a $\frac{1}{8}$-in. liner between the bolster and the flangeway. This process may be repeated several times. Where surface line rails are imbedded in concrete, this replacement can be made with no disturbance to the rail proper and thus lends itself to economy of maintenance. The crossing inclines upward $\frac{1}{4}$ in. from a distance of about 2 ft. from the rail crossing proper in order to raise the wheel tread clear of the stock rail at the intersection. Over this point the flange of the wheel is carried in the saddle of the flangeway, as shown in the illustration. The manganese flangeway has been arranged to rest upon a chemically treated wood cushion attached to a steel shoe, thus giving elasticity to the crossing, a useful feature where the rails are imbedded in concrete.

One-Piece, Dustproof Meter Case

MAHOGANY-VENEER finish is used on a one-piece Micarta meter case designed by the Westinghouse Electric & Manufacturing Company for standard watt-hour meters. This case is strong, resists acids and is dustproof. A tightly fitting nickel-plated brass ring lined with felt prevents any dust from entering the box once the meter is



One-Piece Mahogany-Veneered Case for Watt-Hour Meters with Dustproof Ring and One-Piece Construction

inserted. As a protection to the meter when it is not in use, a lid of the same finish as the box itself is provided.

The handle on this portable case is made of flexible leather and is attached to nickel-plated brass lugs, so that if damaged or broken it can be replaced easily and quickly. Provision is made for plenty of room to grip the handle without cramping the hand or fingers.

Association News & Discussions

Relieving Traffic Congestion

United States Chamber of Commerce Discusses Practical Methods to Make the Capacity of the Streets Greater and Move Traffic Faster

CONGESTION of traffic on city streets and highways was the principal topic discussed by the transportation and communication group of the United States Chamber of Commerce at Washington, D. C., on May 11. The meeting was presided over by A. L. Humphrey, president Westinghouse Air Brake Company.

Elliott H. Goodwin, resident vice-president of the Chamber of Commerce, pointed out the main results attained by the National Conference on Street and Highway Safety. Eight major subjects were considered by that body, viz.: (a) Traffic laws and regulations; (b) enforcement of laws and regulations; (c) education; (d) statistics; (e) study of causes of accidents; (f) design and maintenance of motor vehicles; (g) street and highway traffic facilities; (h) elimination and protection of grade crossings.

The National Chamber, he said, has undertaken to further particularly action as recommended by the safety conference under topics (a) and (g). It is particularly appropriate that in considering measures for dealing with the city traffic problem this body should urge the co-operation of local commercial organizations and trade associations concerned with the traffic problem to take up their share of the burden of applying, so far as practicable, in their local communities or through their lines of industry the plans and suggestions for dealing with the traffic problem as developed through the National Conference.

MR. COATES URGES CO-ORDINATION

Co-ordination of transportation facilities as an aid to the solution of the traffic problem was urged by Frank R. Coates, president American Electric Railway Association. An abstract of his paper appears elsewhere.

The rôle that the automobile industry and the automotive trade can play in connection with the traffic problem was discussed by Capt. E. V. Rickenbacker, vice-president Rickenbacker Motor Car Company, Detroit, and member of the traffic planning and safety committee of the National Automobile Chamber of Commerce. A certain proportion of highway accidents are due to operation of motor vehicles by the criminally careless, by defectives and by intoxicated persons. These cases are amenable to police discipline. A large part of the accidents, however, are due to congestion in traffic, which leads to the confusion of the driver, and to delays, which lead to subsequent unwarranted hurrying, which produces nerve strain. In this respect, the accident problem is simply a symptom of inadequate management of our traffic facilities. No one group is to blame.

Street capacity can be increased 25 per cent or more, in the opinion of the speaker, by adjusting the number of traffic lanes to the volume of traffic in either direction. For instance, in New York on Fifth Avenue, of the four lanes three are used for uptown traffic in the afternoon and the remaining one is ample for the towntown traffic at that time of day. The plan is not applicable to streets with car tracks, but can be used on through boulevards.

Parking is necessarily a local problem. The automobile trade, said Captain Rickenbacker, does not want to advocate unlimited parking. In fact, "unlimited parking" is necessarily a misnomer in crowded sections because it merely means that he who gets there first utilizes that space to the exclusion of others. Decentralization will help, as there will be less need for family motor travel downtown. When the volume of vehicles in any location becomes so extensive as to make it clear that parking is a trespass on the public convenience, in such situations it will be forbidden or limited.

If every shipper over the highways, if every merchant, if every one in the automobile business, realized the dollars and cents cost of traffic delays, we should move much more rapidly toward solution than is being done at present. Routing traffic on less frequented streets will remove an unnecessary burden on commerce and ultimately on the general consumer. Railroad freight terminals in the heart of the city, as well as loading and unloading of vehicles at the sidewalk curb, will soon disappear. Particularly will the backing up of vehicles to unload at the sidewalk have to be stopped.

Traffic Control Is Essential*

Unrestricted Parking Has Become Such an Evil that It Must Be Curbed if Streets Are to Serve Best—Electric Railways and Local Chambers of Commerce Can Co-operate to Improve Conditions

BY FRANK R. COATES
Vice-President Henry L. Doherty & Company
President American Electric Railway Association

TRAFFIC on our streets and highways has increased to such an extent that its proper control presents a problem that challenges the best minds in the nation. It is my privilege to be president of the American Electric Railway Association, and to represent the electric railways at this meeting. There is no industry more vitally interested in traffic problems than ours. The electric railways are operating 80,000 street cars and about 6,500 buses on the streets and highways. They are carrying more than 15,000,000,000 passengers per annum —more than 40,000,000 passengers per day. These passengers are the masses of the people.

There is no conflict of opinion between electric railways and the automotive industry as to the seriousness of the traffic situation, nor any conflict between us and the communities we serve, nor any conflict between us and the steam railroads. I think it is a correct statement that we are agreed that the city traffic problem exists and that it must be solved, or the tremendous losses which were pointed out in the reports of the National Conference on Street and Highway Safety will grow with appalling rapidity. Something more than dollars and cents is involved. The prosperity of the nation, the safety of the public are what concern us most.

AUTOMOBILE NOT FORESEEN

How did this problem arise? It has been only a few years in developing; how does it happen that it now presents a national emergency? The answer is plain. It came about because our forefathers, even the preceding generation, could not foresee the development of the automobile and therefore could not make provision for its demands on street and highway space. Most of our cities were laid out 50, 100 or more years ago. Those who laid them out knew of no kind of highway transportation except horse-drawn vehicles. The electric car, which followed the horse car, had been operating 30 years before the streets were crowded. But about ten years ago street congestion began to attract attention. The automobile was coming into its own. It brought about a demand not only for smoother highways, but for wider ones, for the curbs were being lined with cars.

The thrusting of 20,000,000 unanticipated automotive vehicles into cities and towns which had been laid out and built up by generations which knew only horse-drawn traffic has brought about the terrific congestion which we are now striving to relieve.

*Abstract of a paper before the Transportation and Communications Group, annual convention of the Chamber of Commerce of the United States, Washington, D. C., May 11, 1926.

The coming of the automobile has not been an unmixed blessing to city dwellers, for it has brought heavy demands upon the pocketbooks of the taxpayers, who are called upon to widen streets and highways, to provide traffic control systems, to increase the police force and, unfortunately, to see to it that there are ample accommodations and adequate staffs of surgeons and nurses in the public hospitals. Despite all this the advantages of the automobile to those who can afford them are self-evident, and I believe that the number of automotive vehicles of all kinds will increase for some time to come.

Assuming that there is to be a still greater volume of traffic on the streets and highways, is it not time for the nation to take cognizance of the situation and begin to provide not only regulation and control, but facilities for the future? Is it not time for every growing community to make a transportation plan?

You are going to have street cars for many years to come; you are going to have more buses; you are going to have more private automobiles. The street cars in the medium and larger cities are carrying more and more passengers. In Chicago the surface lines carried 12,000,000 more passengers in 1925 than they carried in 1924. In New York City the surface lines carried 1,036,000,000 passengers last year, and the rapid transit lines carried 1,680,000,000. The street railways in Milwaukee, San Francisco, New Orleans and many smaller cities carried more passengers last year than they did in 1924.

I cite these facts lest any of you have the thought that the street railway is on the skids. It isn't. I know you'll be pleased to hear me say that the net income of our industry showed an increase of more than 13 per cent last year over 1924. Not only that, but the manufacturers report that they received more orders for cars and buses during the first three months of 1926 than they had in the corresponding months of several years past.

The street cars are going to continue to carry the masses. The buses operated by street railways are going to carry more and more passengers to and from parts of the communities not served by railway lines, necessarily at a higher fare than is charged for rail service, but with transfer privileges to and from the rail lines. These two services are rapidly being co-ordinated. The bus service is becoming more attractive to the owners of private automobiles, who have been finding it increasingly dangerous to operate in crowded streets and increasingly difficult to find places to park their cars.

As street car and bus service develops, provision for its growth must be made not only by the operating companies, but by the communities in which the companies operate, because mass transportation is absolutely essential to the prosperity, convenience and happiness of the people.

Being firmly convinced of these facts, I want to urge the adoption by all communities of the recommendations made by the committee on metropolitan facilities of the National Conference on Street and Highway Safety, especially the recommendation that each community form a voluntary civic committee to study the traffic problem, and looking to the future to provide a transportation plan that will take care of the increase in traffic as it comes about.

I am urging our electric railway people to regard themselves as transportation experts rather than as strictly electric railway experts. The street railway people in every city and town should be so well acquainted with the transportation needs of their communities that they can say just what transportation the community should have. They should have no prejudice for the electric car if the bus would serve the community better; they should not recommend bus service if they know that an electric railway extension would render better service. Their duty is to give the community the best possible expert transportation advice. We have before us two distinct problems —the transit problem and the traffic problem—and certainly no men are better fitted by training and experience to handle the transit problem than the local electric railway men. Nor has any group of men more actual experience to present to any disinterested group, like the local chamber of commerce, that may be charged with study of the traffic problem.

The chamber of commerce should be the clearing house for all local problems. It should be the inspirational center of the community. Under its leadership the greatest good for the community should be accomplished. In this kind of activity, it seems to me, the directors and secretaries of commercial associations can find a wonderful opportunity for service to their communities. What is more important to any city than unimpeded transportation? Our streets are the arteries of commerce, the traffic flowing through them is the lifeblood of the city. Choke the arteries and circulation stops, and if it stops long enough business in the choked district is seriously damaged, if not killed.

A city that is known for its good street arrangement and its good traffic movement is bound to be a more prosperous city and more attractive to industry and commerce than one that has permitted itself to develop hardening of its traffic arteries. And unlimited parking produces just that—it thickens the walls of the arteries and narrows the space through which the lifeblood of business must flow, necessarily at higher pressure and with greater danger to civic life than would be the case were the arteries kept open for their purpose—the free movement of traffic.

I do not know of any panacea for traffic congestion. Conditions are different in different communities. But there is a remedy for conditions in every city. What that remedy may be is for the community to ascertain, preferably through its own committees and experts.

One of the commonest causes of traffic congestion is the parked vehicle, and this is most serious in its effect on street car movement. I do not think anyone will question my statement that the primary purpose of a business street is the movement of traffic. When communities permit automobilists to park their cars along both curbs of business streets, they narrow the street from 12 ft. to 14 ft., they blockade the doors of the merchants, they impede all traffic, they create a serious accident hazard, and they endanger or inconvenience the millions who go and come in the street cars. In addition to all that, they interfere with the movement of fire apparatus, and they turn the public streets into storage places for private property.

There simply isn't room in the streets for the parking of all the automobiles in the country—there must be restriction, or the streets will become impassable. I may be accused of special pleading when I make this statement, but let me remind you again that we street railway men must regard ourselves as the representatives of the masses of the people, and when I make a plea for easier movement of street railway cars through the city streets, I am pleading for the vast majority of the population of this country, for the forty millions that ride the street cars every day in the year.

Were there time, and were this the place, I could show you by statistics gathered from many cities that the street car carries from 80 to 85 per cent of all the human beings moving in the public streets in the rush hours, and that this great volume of street car traffic comprises only 15 to 20 per cent of the total number of vehicles in the streets. Put in another way, what I say is that private automobiles, comprising 80 to 85 per cent of the vehicles in the streets in rush hours, carry only 15 to 20 per cent of the traveling public.

These facts, well known to students of city planning and traffic control,

COMING MEETINGS OF *Electric Railway and Allied Associations*

May 19-20—Central Electric Traffic Association, Hotel Argonne, Lima, Ohio.

June 2-4—Canadian Electric Railway Association, annual convention, Quebec, Canada.

June 9-16—American Railway Association, Mechanical Division, annual convention, Atlantic City, N. J. Car matters, June 9-11; locomotive matters, June 14-16.

June 21-25—American Society for Testing Materials, annual meeting, Haddon Hall, Atlantic City, N. J.

June 25-26—New York Electric Railway Association, annual meeting, Hotel Champlain, Bluff Point, N. Y.

June 28-July 2—Central Electric Railway Association, summer meeting, S. S. South American, Buffalo, N. Y., to Chicago, Ill.

July 8-10—Midwest Electric Railway Association, annual convention, Brown Palace Hotel, Denver, Colo.

August 12-13—Wiscoosin Public Utility Association, Railway Section, La Crosse, Wis.

Oct. 4-8—American Electric Railway Association, annual convention and exhibits, Public Auditorium, Cleveland, Ohio.

have brought the suggestion from that distinguished engineer and traffic expert the city manager of Cincinnati that the time is coming when there shall have to be a separation of the necessary from the unnecessary traffic in congested districts. The necessary traffic is the transportation of the people in public service vehicles—the street cars and the buses. These vehicles would be given preference, because they are providing mass transportation in the public service, and under public regulation and control. Following them in order of precedence would be the taxicabs and private automobiles.

I do not expect to see this separation of traffic for some time to come, although I believe it would be to the advantage of the public. Instead, I look for a more disinterested attitude toward the parking and congestion problems on the part of those who in the past have been inclined to suit their own whims and fancies rather than to have consideration for the welfare of the community as a whole. I believe that people whose personal convenience has meant the inconvenience of scores and hundreds of persons not so fortunate as to own a private automobile are going to recognize the inequity of the situation and agree to abolition of parking in streets where there are street railway tracks, and to the reduction of the volume of unnecessary traffic in such streets. There have been some excellent examples of this kind of public cooperation, notably in Pittsburgh, where the merchants and other business men have found by experience that abolition of parking has speeded up the movement of customers to their stores and has increased their business.

Competing Services Waste Space

There is no question in my mind but that there is a tremendous waste of street space by competing services in not a few communities. By all the rules of logic and by all the elements of justice, mass transportation service should be supplied the public by the rail lines. Competition by jitneys, whether they are competing with a city railway, or interstate highway vehicles competing with a steam railroad, cannot be justified, because it is wasteful, and damaging to the public interest.

Co-ordinated street railway and bus service is now being rendered by nearly 300 electric railway companies. The railways have found the bus to be an efficient supplementary vehicle, with which they can give service to parts of the community not yet sufficiently developed to warrant construction of rail lines, or to serve parts of the community with what we call de luxe service, that is, a seat for every passenger in vehicles with the most comfortable kind of seats, operating on an express schedule. The principle of co-ordinated service is sound, and is being carried to its logical conclusion in some of our cities, notably Philadelphia, where the rapid transit company is operating not only the rapid transit and street car lines, but the buses in city and suburban service, and the taxicabs as well. Such co-ordination makes for efficiency, economy and public satisfaction, and in addition to all that, makes possible adjustments of routes to aid in reducing congestion in the streets.

Trends in Motor Vehicle Legislation Discussed

CHANGES recently made in laws governing the operation of motor vehicles were outlined before the annual meeting of the National Highway Traffic Association at New York on April 30. According to Russell Huffman, secretary Motor Vehicle Conference Committee, license fees have gradually increased, particularly those for buses and trucks. There has been a marked tendency also to increase the gasoline taxes. The allowable widths of buses and trucks have been decreased, and there has been a tendency to reduce the gross weight allowed. With reference to speed, the trend has been to permit a much higher rate.

Common carrier vehicles are being more and more regulated by the state governments, he said. Equipment of motor vehicles, such as lights and brakes, have been receiving considerable attention at the hands of legislators. So far as enforcement goes, the tendency has been toward heavier penalties.

Mr. Huffman called attention to the growing desire on the part of state public utility bodies to increase their jurisdiction over the physical operation of vehicles. In this they are taking over functions formerly left to the motor vehicle departments of the state. At present, three-fourths of the states have enacted laws regulating widths and heights of motor vehicles. The greatest width permitted is 108 in. and the narrowest is 84 in. Most of the states have fixed the width limit at 96 in. and the height at 12 ft. 6 in. Weight limitations range from 30,000 to 18,000 lb., the average being about 24,000 lb. A noticeable movement during the past few years has been the tendency to base the weight limitations upon the character of the highway over which the vehicle is to operate. While this has not been enacted into law, several state highway officials are using this method to determine the weights permitted over their roads.

Other papers were presented by M. C. Horine, International Motor Company, New York, on "Highway Safety as Promoted by Adequate Brakes"; by E. P. Goodrich, consulting engineer, New York City, on "High-Speed Highways Required for Economic Transportation," and by Col. I. C. Moller, traffic engineer, Washington, D. C., on "Traffic Control Systems at Street Intersections."

Economizing in Purchases and Stores Department

Methods of Saving Money in Buying and Handling Materials and Supplies Discussed at Lively Meeting of New England Street Railway Club

PURCHASING department representatives, storekeepers and manufacturers' agents combined to make the May 6 meeting of the New England Street Railway Club at Boston, Mass., one of the liveliest in recent months, the topic of the day being how to save money in buying and handling materials and supplies. President F. D. Gordon occupied the chair, and after the usual topical meeting in the afternoon at the Copley Plaza Hotel an enjoyable dinner was held, with addresses by Managing Director Lucius S. Storrs of the American Electric Railway Association, George E. Pellissier, assistant general manager Holyoke Street Railway, and Harry C. White, Edison Lamp Works of the General Electric Company. Messrs. Storrs and Pellissier spoke on making better use of the opportunities afforded by the club and the American Electric Railway Association, while Mr. White gave a spectacular demonstration of high-voltage phenomena, with personal reminiscences of Thomas A. Edison and the late Dr. C. P. Steinmetz.

George E. Haggas, chief engineer Cumberland County Power & Light Company, Portland, Me., opened the afternoon meeting with an account of the success which has attended the combination of purchasing and engineering functions in one department in the past five years. The engineering department's knowledge of the future development of a public utility property qualifies it in large measure to undertake purchasing tasks. This advance information enables rush shipments to be reduced in number, and cuts down telephone and telegraph costs; it enables time to be saved in conferences between departments and in referring matters back and forth. Many interdepartmental letters and "memos" are thereby eliminated. This saves time and enables the company to buy at better advantage in many cases. Overhead costs and so-called "buck passing" are cut down. The company tries to buy in large volumes, pooling daily supplies with construction supplies.

R. S. Baldwin, purchasing agent the Connecticut Company, New Haven, Conn., discussed the value of quantity buying and its relation to market trends. Here the skill of the purchasing agent finds full expression, and upon his judgment much depends. Some kinds of supplies, like those for snow-fighting equipment, belong in the seasonal class and others, like pipe, fittings and steel parts, can advantageously be bought on the hand-to-mouth basis. Mr. Baldwin said that his company takes all cash discounts offered and saves about $36,000 per year by so doing. It is the company's practice not to disclose bids to competitors, and in general the "last" price is quoted at the outset. In the main it is better to buy standard material than to manufacture supplies in railway company shops, though this should not be an ironclad rule. Unless a very substantial saving results, company manufacturing is unjustifiable.

F. A. Barbey, Boston, in discussing the foregoing papers, commended the pioneer work of the Canadian Pacific Railway in establishing the authority of the purchasing agent as an executive buyer. He criticised the policy of tak-

ing cash discounts in view of the low price at which money can be borrowed, and pointed out the futility of trying to keep prices secret from the trade. George E. Pellissier, Holyoke, cited the excellent co-operation obtaining in his company between the engineers and purchasing staffs. James Alexander, Westinghouse company, New Haven, Conn., said that his company's cash discounts in general are given to buyers with lesser credit stability, although certain classes of merchandise and supplies carry cash discounts available generally. Mr. Baldwin does not figure the cash discount in comparing prices and bids, but regards it as a premium.

Advantages and Disadvantages of Quantity Buying

Storeroom practices was the subject of a paper by W. F. Crowe, secretary Springfield Street Railway. Mr. Crowe told how the methods used by his company and by the Worcester Consolidated Street Railway had been modified during the past six years and of the advantages which had resulted from the change. The present system was described in detail.

Under the procedure of this plan the storekeeper, being in need of material, places a requisition with the purchasing agent and after it has passed through the regular channels and received the necessary approvals, the purchasing agent arranges for the purchase of the material and issues his regular order, a copy of which is sent to the storekeeper. The latter notes on his copy of the requisition the order number and on his stock card indicates the date, requisition number and quantity ordered. When the material is received, the copy of the purchasing agent's order is used as the receiving record, on which is indicated the material received, etc., and passed along to the storekeeper as his record of material received for that day or under a particular order and is used by him in approving, checking and passing the invoice for the material received. After the storekeeper has certified on the invoice as to the quantity, quality and weights of the material received, this information is recorded on the stock card and the unit cost to be used in charging out that particular lot of material is determined, and the invoice forwarded to the manager for approval and return to the purchasing agent, who, after noting his records, forwards the original bill to the company's office for payment.

R. A. Weston, special accountant the Connecticut Company, told how the physical arrangement of material in the storeroom influences the buying of supplies. He suggested that the purchase order should originate at the bin in the storeroom.

"To do this we must have our material in such shape that we can count and inventory it at a glance and without handling," he continued. "This may mean revolutionizing your storeroom, but it can be done and it will be found to pay. Build open shelving. Pile your materials on the shelves in what is known as the 'unit piling' method. Make everything work toward visibility. You will find that you can concentrate your materials in much less space because of the greater flexibility of the system.

"Briefly, the 'unit piling' system consists in designating so many pieces of material, as they are being placed in stock, as a unit. This may be 5, 6, 10, 12, 50, 100, a gross, etc. Then as the material is stored it is separated in some manner so that each unit contains this designated number of pieces, and each such unit is in some way separated from the other units of the same material as to be plainly discernible, so that in taking stock the stockman simply counts the units and not the items."

T. H. McGarry, purchasing agent, explained how the Eastern Massachusetts Street Railway inaugurated a monthly budget system of ordering materials and supplies some five years ago. Prior to this time materials and supplies were requisitioned by two general storekeepers, one north of Boston, and one south of Boston, on a maximum-minimum stock basis. Materials and supplies so requisitioned and purchased were delivered to the three storerooms, and then distributed to various parts of the system from these storerooms. With the inauguration of the budget system this procedure was changed; now materials and supplies are in general delivered directly to each of the operating districts and shops.

On the twentieth of each month, the Boston purchasing department receives budget requisitions from the seventeen operating units. These requisitions are presented on printed forms and indicate the quantity of material required, the quantity on hand at the time requisition is issued, monthly consumption, also the use to which the material is to be put. The material covered by these budgets, unless of a special nature, is generally purchased and shipped the early part of the following month.

These monthly budget requisitions are originally prepared by the foremen of the several sub-departments, such as rolling stock, track, power, line, bus and truck and office supplies. The requisitions so prepared are carefully reviewed by the managers who are primarily responsible for the quantities ordered. In the case of the two shops, the superintendent of rolling stock and shops is responsible for all materials requisitioned, and the superintendent of the Quincy Point power station is responsible for that station's budget, and also for the Quincy automotive service station requirements.

In the opinion of the management the placing of responsibility for the requisitioning of materials and supplies with the department heads and managers has enabled the company to reduce its materials and supplies investment account materially.

Quantity buying in anticipation of future needs may mean prohibitive prices eventually because of obsolescence and other items making up carrying charges, according to W. W. Tirrell, statistician, and formerly examiner for the Interstate Commerce Commission. Some commodities deteriorate rapidly. Much material is carried from inventory to inventory, indicating unserviceable material in stock.

The purchasing department is not always responsible for quantity buying. Requisitions are drawn, frequently, too far in advance of actual requirements, and for excessive present quantities considering the prospective length of the work or job. Central control of stores operations curbs the desire of the under-official for large supplies to be kept constantly in stock. One control, held responsible for adequate supplies in stock, has worked well in the steam railroad field, wherever applied. A five-year comparison clearly demonstrates the benefits accruing under central control.

Stores budgets which place limits on the value of requisitions which can be issued each month have worked out well in the steam railroad industry, according to A. A. Ordway, purchasing agent Boston Elevated Railway. He thought, however, that they are too complicated and require too much bookkeeping to be satisfactory for electric railways.

Other contributions to the discussion of the subject of purchases and stores were made by A. B. Fuller, purchasing agent Union Street Railway, New Bedford, and W. F. Maher, storekeeper United Electric Railways, Providence. Abstracts of these papers will appear in a future issue.

Managing Director Storrs of the A.E.R.A. commended the increase of club members from the automotive industry in opening his address at the evening session. He emphasized the great value of round-table discussions to the industry and pictured the increased breadth of outlook derived from seeing how neighboring properties meet their problems. Group meetings and discussions as practiced by the Central and California association members are helpful and deserve wider application. The possibilities of building revenue on interurban railways from freight service were stressed. Regular meetings of operating men to discuss statistics of service rendered, costs, etc., offer helpful opportunities for betterment of practice on individual roads. A free interchange of ideas, the speaker said, is preferable to sluggish movement of thought resulting from excessive pride in their authorship. The industry would gain by reading more, Mr. Storrs declared. Closing, he outlined the activities of the A.E.R.A. headquarters staff and urged his hearers to call upon the New York office for help at all times.

Mr. Pellissier told how the New England Street Railway club could be made of more value to its members. His recommendations included the display of more interest by the railway executives, more definite objectives, and certain changes in method of electing officers.

Central Traffic Association Changes Meeting Place

CENTRAL Electric Traffic Association will hold its next regular meeting on May 19 and 20 at the Hotel Argonne, Lima, Ohio, instead of at Fort Wayne, Ind., as previously planned. This change of meeting place is due to the fact that hotel accommodations could not be secured at Fort Wayne on the dates mentioned.

Canadian Convention at Quebec June 2-4

BEAUTIFUL Château Frontenac, overlooking the St. Lawrence River in the city of Quebec, will throw its doors open to celebrate the 22d birthday of the Canadian Electric Railway Association. The meeting will be held jointly with the Canadian Electrical Association on June 2-4. Regular business sessions of the two associations will be held separately; but both will meet in the Dominion Drill Hall on Grande Allee, where also the manufacturers' exhibits will be shown.

The entertainment committee includes in its many diversions a golf tournament to be held at Kent links, a trip to Ste. Anne de Beaupré, a dinner and dance at Kent Hall, and a grand final ball at the Château.

William S. Hart, president of the Canadian Electric Railway Association, will preside at the meetings. The two papers to be presented are: "The Motor Bus in Urban Transportation," by Dean J. Locke, staff engineer Public Service Railway, Newark, N. J., and "Budgetary Control for Electric Railways," by H. C. Patten, comptroller Toronto Transportation Commission, Toronto, Canada.

In addition to these papers, special arrangements have this year been made for the discussion of six topics of general interest. Two of these topics will be discussed each day and two specially prepared five-minute talks will be the means used in presenting these subjects to the meeting.

The subjects are: June 2, "Transfer Tickets," J. McCulloch and C. M. Shaw; "Sweepers," F. D. Burpee and A. M. Lindsay. June 3, "Schedule Speeds," G. E. Waller and A. J. Tobin; "Armatures," A. M. Lindsay and D. Chenard. June 4, "Paving," A. T. Spencer and T. U. Fairlie; "Car Painting," F. S. Beattie and F. E. Holland.

American Association News

"Peddlers Do Their Stuff"

PEDDLERS held sway at the fifteenth regular meeting of the Metropolitan Section of the A.E.R.A., on the evening of May 7. The announcement of the meeting said that "free rein will be given to the peddler's spirits," and so it turned out. Horace Sisson presented "The Tough Life of a Peddler," movingly illustrated. The captions to the pictures portraying a day in the life of the peddler contained many wise cracks, but the film itself was somewhat weak in spots. The peddler is supposed to be a contrite mortal who waits in fear and trembling outside the office of the P. A., but in this case he hobnobbed familiarly with the railway officials until one began to wonder which of the two personages owned the Rolls Royce in which the two drove away together.

W. H. Woodin, president of the American Car & Foundry Company, was down on the program for the principal address, but he was prevented from attending. A letter of regret from him was read by Fred Harper. Mr. Woodin said in short that the manufacturer was a co-partner of the railway man. Each man's problem was the problem of the other.

Transportation must be made more desirable and more salable. He ran the gamut of all the trials and tribulations of the railway and drew a picture of the difference between the sales efforts of the manufacturer and the transportation company. Fresh and modern equipment is absolutely necessary. The silent transportation salesman is the car or the bus. One problem always remained, namely, that of selling the service whatever it may be. The manufacturer is the operator's silent partner —he can prosper only as the operator prospers.

President Hulme of the Metropolitan Section turned the meeting over to Jerry Stanton to conduct. Before doing so, however, Mr. Hulme said that the annual outing would be held at Pelham Bay Park on Aug. 11. Mr. Wheeler, chairman of the entertainment committee, had informed Mr. Hulme that only 400 could be accommodated at the dinner that day, so the need was imperative to get reservations in early.

The evening was concluded with a talk by Capt. Irving O'Hay, the original "Soldier of Fortune." He is one of the men on whom Richard Harding Davis based his book "The Soldier of Fortune." Captain O'Hay talked for one hour and forty minutes and there were not two dull minutes in his discourse. His remarks were packed with wit, wisdom and satire. The burden of his remarks was that it does not pay to take things too seriously.

Public Service Reorganizes Company Section

AFTER an interval of eight years, during which no meetings were held, the Public Service Railway Company section of the American Electric Railway Association has been reorganized. This section is the second oldest of the company sections and was very active until 1918, when the emergency conditions resulting from the World War necessitated a suspension of its activities. In answer to the call of M. R. Boylan, vice-president in charge of operation, nearly 400 old and new members met in the assembly room of the Public Service Terminal Building, Newark, N. J., on May 6 and reorganized the section.

Short talks stressing the value of the activities of company sections and expressing high hopes for the success of the new Public Service organization were made by C. E. Morgan, vice-president and general manager Brooklyn City Railroad; J. W. Hulme, assistant superintendent of equipment Interborough Rapid Transit Company; J. W. Welsh, executive secretary American Electric Railway Association; J. W. Colton, editor *Aera;* Labert St. Clair, publicity director American Electric Railway Association; Guy Hecker, special engineer American Electric Railway Association; H. C. Eddy, street railway engineer Board of Public Utility Commissioners of New Jersey; J. A. Miller, Jr., associate editor ELECTRIC RAILWAY JOURNAL, and Harlow Clark, director of publicity Public Service Railway.

Officers of the company section chosen for the coming year were: President, A. T. Warner, assistant to the vice-president in charge of operation; vice-president, Philip McGuire, manager Central Division, and secretary, Joseph O'Driscoll, bookkeeper, accounting department. Directors chosen were J. M. Symington, manager Essex division; J. E. Rutledge, manager Passaic Division: W. H. Shepard, manager Hudson Division; M. R. Boylan; vice-president, director ex officio.

It was decided to hold a series of meetings, possibly one in each of the operating divisions of the company. Refreshments were served at the conclusion of the meeting.

Special Reports Available

FOLLOWING is a list of special reports that have been prepared by the Bureau of Information and Service of the American Electric Railway Association. They are available to member companies upon request.

Bulletin No. 77: Electric Railway Operations in 1925.—Contains statement of the revenues, expenses, net revenue and passenger traffic of 327 railway companies and 96 affiliated bus undertakings in 1925, in comparison with the same items in 1924. Also gives complete comparative analysis of the operations of 221 railway companies classified into city, interurban and combination city and interurban companies with each group further classified into three smaller groups according to the size of the company. For each group there is shown a complete income statement, details of operating expenses, operating statistics and derived ratios and unit figures for comparison.

Bulletin No. 78: Bus Operations of Electric Railways in 1925.—A summary of the analysis of the bus operations of 92 electric railways and a tabulation of the individual returns of each company with certain of the more important figures shown on unit basis for purpose of a more accurate comparison. In addition, it contains combined statement of a large group of companies that reported detailed operating expenses and statistics showing a complete detail of expenses, passengers carried, bus-miles operated, gasoline consumed, and complete schedule of buses operated showing the seating capacity and a summary of the methods of depreciation on buses adopted by the various companies.

Bulletin No. 79: Special Factors Affecting Working Conditions of Electric Railway Trainmen.—A compilation of information covering a number of miscellaneous conditions such as status of workmen's compensation laws in the various states, employee representation systems, pension systems, requirements as to physical examinations, mutual benefit associations, establishment of recreation rooms, union membership and labor turnover during 1925.

Bulletin No. 80: Use of Reduced Rate Tickets.—An analysis of the effect of varying reductions from the cash fare on the proportion of reduced rate tickets used. For each company there is shown the cash fare and the ticket rates and then the percentage of revenue passengers paying cash fares, using the various ticket rates or traveling on a weekly pass where there is a weekly pass in effect.

In addition to the above, the following supplements have been prepared, bringing the information they cover, down to May 1:

Supplement No. 2 to Trainmen's Wage Bulletin No. 69.

Supplement No. 2 to Busmen's Wage Bulletin No. 70.

Supplement No. 8 to City and Interurban Fare Bulletins Nos. 40 and 41.

Cost of Living Studies (Bulletin No. 81).

The News of the Industry

New York Governor Hears Opposition to Bus Bills

Charges that sinister influences of an unknown origin are behind the Sargent and Thayer bills amending section 54 of the public service commission law so as to prevent a stagecoach corporation from acquiring more than 10 per cent of the capital stock of a street railroad corporation without the consent of the Public Service Commission were made by Assistant Corporation Counsel Gregory U. Harmon of Buffalo at a hearing held before Governor Smith on the two bills on May 13. "We don't want the International Railway to be owned by a bus line," declared Mr. Harmon. "Now they are operating both cars and buses, but as two separate companies, and their finances are separate and distinct." Representatives of organized labor from Buffalo also opposed the bills. Governor Smith stated that as he understands the matter the purpose of the bills is to get the same control over a bus company that tries to buy a street railroad as a transportation corporation acquiring the capital stock of another transportation corporation. "At the present time," said the Governor, "there is no regulation over a bus company buying stock of a street railroad company. This bill fixes it so that regulation is had the same as applies to other corporations."

It was also pointed out that at the present time a bus corporation organized as a business corporation and not under the transportation corporation law might acquire with no restriction the entire stock of a street railroad company. The Governor closed the hearing after the opposition had finished.

The Thayer bill and Sargent bill are different in that while the Sargent bill provides that bus corporations organized pursuant to the transportation corporation law shall be subject to its provisions, the Thayer bill provides that a corporation, however organized, shall be so subject to the public service or transit commission. The Fifth Avenue Coach Company is not organized under the transportation corporation law, but under the Thayer bill in the purchase of stock of a street railroad company would be subject to its provisions.

Elevated Men in Chicago Want More Pay

Five thousand employees of the Chicago Rapid Transit Company voted on May 8 to ask an increase in wages of 5 cents an hour when their present contracts with the company expire on May 31. They also request that a $1,000 death benefit and a weekly sick benefit of $20 be established at the expense of the company.

The new scale, if granted, would give motormen a maximum of 82 cents an hour, conductors 77 cents, guards 75 cents and proportionate raises in the wages of all shopmen, station employees, porters and trackmen. According to officials of the local union, the increase would re-establish the maximum rate prior to the 1922 reduction, thereby increasing the company's annual wage bill by $880,000.

Similar wage demands were made by train service employees of the Chicago Surface Lines at a meeting on May 3.

Service in Akron Restored to Normal

Railway There Believes Strike to Be Broken—Buses Play Big Part in Helping Company Free Itself from Union Domination—Interurbans Going Back Into Service

STREET CAR service has been restored to normal both day and night on the Akron city system of the Northern Ohio Power & Light Company. The Amalgamated Association has lost control and all trainmen now working have signed individual contracts. The Canton city situation is practically cleared up and the union control there broken. Complete day service has been restored in Canton and night service will be back to normal in a few days. No attempt has been made to operate interurban cars, but the company is determined to throw off union domination on its entire interurban system from Cleveland to Uhrichsville.

Buses and a satisfied public won the fight. At one time the company was operating 227 buses in city and interurban service. With these buses, aided by the few street cars that were manned by loyal trainmen, the riding public was fairly well accommodated. At any rate, they were so well satisfied that many openly expressed the hope that "the company would not compromise this time, but fight it out."

Along the entire interurban system, as well as in the cities, the company is receiving full public support. There probably has never been a strike of the magnitude of this upon any electric railway property where the public supported the company as it has in this instance in northern Ohio.

Hugh D. Friel, U. S. labor commissioner, who attempted to bring about a compromise, admitted in the newspapers that he had "never found such an apathetic public."

In Canton an attempt was made to secure the passage of an ordinance requiring the company to train men twenty days in the city before they could operate cars. The City Council laid the ordinance to rest in the judiciary committee.

In making the fight, the company's first step was an announcement that the "unwarranted strike had been called by a Mr. McMorrow of the Amalgamated Association without notice to the company or the public," but that "the company would operate all the cars possible and get additional buses without delay." The public was asked to have patience. The public said, in effect: "Fine, go to it, we have had enough street car strikes, so end them for all time."

The contest was staged in Akron City, the remainder of the system standing practically idle. The company announced in a public advertisement that it was "through with the Amalgamated Association" and that it "would not deal with union representatives." Day by day the Akron city service was built up. Starting with the Rose Avenue-Lakeside line, the Main Street and East Market lines were added. When full day service was restored on one line another was started. Thus was complete day service built. Following this, the work of bringing the night car service back to normal began. This was handled in the same manner as the day service. Ten days after the strike was called service was back to normal in Akron.

After Akron service had been restored, the company turned its attention to Canton, where enough loyal trainmen were voluntarily working to supply 50 per cent normal day service and more men were being trained. Starting with eleven runs that dropped off late in the afternoon, lines were added one by one and complete night service finally was established Thursday night of this week.

COMPANY PLANNING AHEAD

The work of restoring Massillon city service is now going on. The work of restoring interurban service will begin on May 17. This will be handled by divisions, the first to be taken up being the division south of Massillon, where there has been but little service.

The strike has been attended with very little violence so far. Bricks were thrown through the windows of several cars and buses. Shots were fired into a Barberton car, and one motorman and one bus driver were injured. Long tacks held upright by thin cardboard were strewn along bus routes, but patrols found them before much damage was done.

Approximately 100 interurban shopmen have been laid off since the strike started. They were in the Silver Lake Junction, Massillon and Dover shops.

Additional bus repair men have been employed.

For the last fifteen years, car riders in Akron and other parts of the Northern Ohio Power & Light Company's system have suffered from strikes. These strikes have lasted from one to eleven days, after which Amalgamated Association officials would bring about a settlement at the expense of the company. This time the company decided to fight it out with the union and establish the open shop policy under the individual contract system.

Last-minute messages state that the situation is satisfactory, with complete service in Akron and practically complete in Canton. No effort has been made to operate the interurbans and no effort will be made for perhaps another week. The buses are handling the interurban passengers satisfactorily. Efforts by the Amalgamated Association to bring about mediation and recognition of the union have all failed, with the public standing behind the company. Evidences of violence have been slight—an attempt was made to dynamite one of the company's high-tension lines and one motorman in Cuyahoga Falls was injured when a brick was thrown through a car window.

Bureau of Public Utilities Formed

The Research Bureau of Public Utilities was recently organized, with offices at 11 East 36th Street, New York, N. Y., by the National Association of Mutual Savings Banks to supply banks in all parts of the country with information on public utility bonds. This is the first of this kind of bureau, the formation of which resulted from action taken by the National Association of Mutual Savings Banks at its convention in Poland, Me., last June. A committee then was named to recommend action on the establishment of the bureau. The committee consulted with a group representing 30 public utilities and financial houses interested in public utilities.

New Subways in New York Face Delay

At an executive meeting of the committee of the whole of the Board of Estimate of New York on May 7 it was found that available funds would fall at least $50,000,000 short of the requirements for the fulfillment of the contracts already made or contemplated by the Board of Transportation for subway construction.

Members of the Board of Estimate pointed out that to raise all this money would not only preclude the carrying out of many urgent public improvements to which the Board of Estimate is committed, but would carry the city far beyond the constitutional limit of its borrowing capacity.

The suggestion was made as one ray of hope, in financing the subway plans, that part, at least, of the required funds would have to be raised by taxation, by putting it in the annual tax budget, which would probably mean a material increase in the tax rate.

John H. Delaney, chairman of the Board of Transportation, insisted the city must reserve $100,000,000 to carry out the subway construction program for the balance of the calendar year. He was informed by Comptroller Berry that all that it is possible to allocate for subway construction for the balance of the year is $50,000,000. Chairman Delaney insisted that the $100,000,000 would be absolutely necessary to meet the contracts to be awarded this year.

Franchise Nearly Ready

New Grant at Richmond to Go Before City Council for Final Action — Bus Measure Separate

Sitting for nearly two hours on May 3, and revising every section of the proposed blanket franchise, the streets committee of the City Council of Richmond, Va., completed its work, and the document, approved by every member, has been forwarded to the Common Council. That body fixed May 13 for disposition of the ordinance.

At the conclusion of the committee session Chairman Ordway Puller took occasion to thank his colleagues for the valiant and tireless service they had given to the work just completed. For more than three years this committee has considered this measure. It has gone into every phase of the situation and considered every angle and believes the grant is satisfactory to the people.

W. E. Wood, vice-president of the Virginia Electric & Power Company, also expressed his appreciation of the work of the committee since his association with its members. He said:

> We have the interests of Richmond at heart as much as the members of this committee or the most humble citizen, and we shall strive to carry out faithfully all the requirements of the franchise, and go even further when it looks like the city may gain in prosperity and progress through our efforts, feeble though they may be.

The plans of the company for the expenditure of $1,500,000 in the purchase of buses and other equipment and for extensions to the present railway system will be carried out as rapidly as possible, and the unification of the railway and bus lines accomplished with equal speed. Mr. Wood said:

> Now that the franchise has passed the committee and the road ahead seems clear, I wish to say for the company that we will not only live up to every stipulation contained in it, but that we will do so as rapidly as possible. The company is not looking for loopholes in the franchise, but for its speedy passage so that we can carry out the plans for the improvement of the local service that we have drawn up and which were presented to the committee.

The passage of the franchise through Common Council does not entirely clear the way for the unified bus and trolley system, as the city must adopt a bus ordinance, separate and distinct from the franchise, before the trolley and the bus lines can be unified.

When the matter was first broached the inclusion of the bus lines and the street car system into one franchise was considered and was agreeable to the power company. The city assumed the attitude, however, that to include the buses in the blanket franchise would be to place them under the control of the Virginia State Corporation Commission, as the railway system now is. By providing for them under a separate bus ordinance their control would still be in the hands of the city.

Express Car and Local Bus Service in Oakland and Berkeley

Application has been made by the Key System Transit Company to the City Councils of Oakland and Berkeley and to the California Railroad Commission for permission to operate express service on the Telegraph and Shattuck Avenue car lines with a parallel local bus service. In other words, the trolley cars will provide the speedy service to and from Oakland and Berkeley, while the buses will provide the slower means of transportation. If the application is granted and if the plan proves successful traffic in the East Bay cities will be revolutionized.

This is a reversal of the original plan, which called for express bus service between the two cities for a 15-cent fare. Under the new plan the fare will be the same as now charged all over the East Bay—7 cents.

J. P. Potter, general superintendent of the Key System Transit Company, is the father of the new plan. He and other officials of the company believe it will prove so successful that it will be extended to other lines and may be tried in other cities where rapid transit is becoming a problem.

It is proposed to reduce the running time of the street cars by a skip-stop schedule. Only eight stops will be made between Seventeenth Street, the heart of the business district in Oakland, and Alcatraz Avenue in Berkeley. It is estimated that the express trolley cars will cut down the running time from 28 to 21 minutes.

The express service will be supplied between the hours of 8 a.m. and 9 p.m. daily. Before and after those hours and on Sundays the schedule will be as at present.

Speaking of the proposal, General Manager George H. Harris said that the original suggestion of an express bus service was reversed after a study of conditions and in the interest of keeping present schedules.

Report Soon on Power for Rochester Subway

Power other than electricity may be used for hauling freight on the subway built by the city of Rochester, N. Y. This was indicated by the action of the Board of Contract and Supply when it rejected all bids for the overhead wiring. It is thought that either gasoline or oil burning engines will be used.

The subway is expected to be opened in the fall. It bisects the heart of Rochester and is built in the abandoned Erie Canal bed. Plans for its operation are still undecided. The project was put through at city expense, but municipal operation is believed to be a remote possibility. It is thought that some carrier, probably the New York State Railways, will operate the line under a lease.

Besides providing freight service for scores of industries, the new railroad will take the interurban cars off the streets of Rochester and provide limited passenger service from outlying sections into the business area.

A committee of citizens is expected to report.

Fare Hearing in New York State Adjourned

After completion of cross-examination of the witnesses of the New York State Railways by the city of Syracuse on May 13 an adjournment was taken by the Public Service Commission in the Syracuse rate case to a date to be announced later. Two days were consumed in cross-examination.

Franchise Discussion Renewed in Chicago

If the action of the committee on local transportation is ratified by the City Council of Chicago a clause providing for the construction of 30 miles of track extension by the Chicago Surface Lines every year for five years will be inserted in the Chicago traction ordinance recently drafted by Corporation Counsel Busch. Although the company has been unable to comply with the provision for several years, the present franchise calls for 23 miles of extensions each year.

Since they returned on May 6 from a ten-day tour of inspection in a number of eastern and Canadian cities the members of the transportation committee have been holding sessions daily with a view to an early settlement of the present difficulties.

Should the Council approve the essential features of the new ordinance as regards unified operation of all lines and immediate expansion of facilities, etc., legislative approval of the terminable permit plan will be asked of the State Legislature in 1927. Enactment of a law of this kind by the General Assembly would give Chicago home rule, with exclusive authority over all local transportation lines.

While the committee proceeds to discuss the surface lines ordinance submitted by Corporation Counsel Busch, the work of drafting a separate ordinance dealing with the elevated railway has also begun. The ordinance will provide for certain yearly extensions and for conjunctive operation with the surface lines and the proposed system of subways.

As a result of impressions gained in other cities Alderman Coughlin has submitted a plan, in connection with the ordinance now under consideration, which contemplates the construction of a comprehensive independent subway system based on the special assessment principle.

Electors Vote Approval of Hamilton, Ont., Contract

Hamilton electors voted on May 10 their approval of the franchise agreement between the city of Hamilton and the Hamilton Street Railway. The count stood 14,868 for and 4.768 against. By the terms of the agreement the city is assured of a 5-cent fare until 1928, when either party to the agreement may appeal to the governmental railway board for a change in the fare charge. The city may negotiate for the purchase of the system at the end of any five-year period, while the company undertakes to make many needed improvements to the system.

Abandonment of railway service in Hamilton was threatened in December, 1925, following the defeat of two railway by-laws, one providing for the city's purchasing the system and the other for the granting to the Hamilton Street Railway of a 25-year franchise. Last-minute negotiations resulted in a continuation of the service pending the submission of a new contract to the voters.

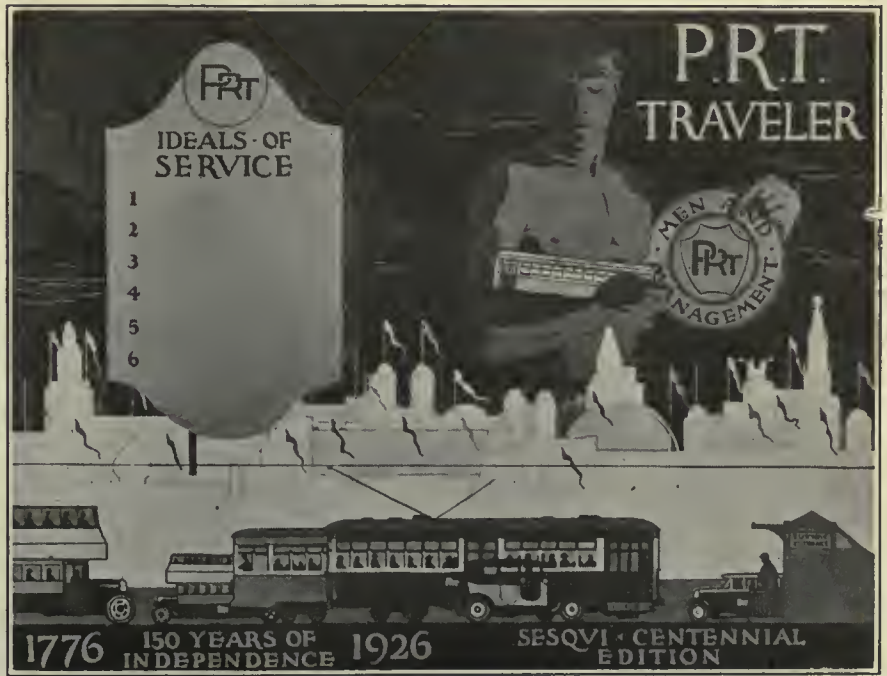


Judges and Winning Entry for the P. R. T. Cover Contest for 1926
Left to right, Ralph T. Senter, vice-president Mitten Management and member of the Art Club; Edward W. Redfield, artist, and Charles Harding, artist.

John J. Gough Wins P.R.T. Award

A Philadelphian, twenty years of age, without any special art training, won the Philadelphia Rapid Transit Company $500 prize for a cover suitable for reproduction in the Sesqui-Centennial number of the *P.R.T. Traveler*. He is John J. Gough, 2224 Christian Street. Mr. Gough is employed in the art department of the Ketterlinus Lithographic Manufacturing Company. He has been with the concern for two years, during which he developed his talent. The prize winner attributes his success to Thomas J. Flanagan of Germantown, an artist who has taken an interest in the young man and has taught him for two years while at the Ketterlinus company. In 1924, Mr. Gough won the second award in the art contest for a cover for the N.E.L.A. program, held by the Philadelphia Electric Company.

In the recent contest honorable mention went to two other Philadelphia artists, Harry S. Moskovitz, 1523 Chestnut Street, and Edward Gammon, 1762 Church Lane, Germantown. The contest was open to any artist in the United States. The rules specified that the design must possess some theme suggestive of the spirit of city transportation in the year of the Sesqui-Centennial International Exposition. As many as four colors could be used. Oils, water colors, charcoal, crayon, pen and ink or pencil designs were acceptable. Several hundred entries were received in this contest from Philadelphia and many out-of-town points.



Winning Cover in Contest for the Sesqui-Centennial Edition of the "P.R.T. Traveler"

Enabling Bill Signed by New York Governor

Governor Smith of New York has approved the Cuvillier bill as chapter 824 of the laws of 1926 empowering the city of New York for the improvement of traffic conditions in the streets "to acquire and remove from the streets any street surface or elevated railway, and to issue stock, bonds or tax notes to defray the cost thereof, and to authorize the sale of such street surface railway or elevated railroad by its owners to the city and to terminate, in such case, the franchise or franchises for the operation thereof."

During the legislative session the opponents of the measure dubbed it the "mystery" bill.

Denver's Picturesque Road Passes

Some years ago folks in the East, North, South and West were amused at receiving from Denver, Col., a post-card with the picture of a street car showing a horse riding on the rear platform. This was the Englewood-Cherrelyn line. The picture portrayed a true condition of affairs. It was like this. Dick, the horse, would pull the car up the hill from Englewood to Cherrelyn, and returning Dick would mount the rear platform while James O'Brien, the driver, would stand on the front platform so as to be ready to apply the brake. This plan was followed between 1883 and 1910.

Then the road was electrified. Now, in 1926, the cars have been abandoned because the line did not pay. Buses were placed in service on May 5.

First Run of Electrified System

A trial run was made recently on the newly electrified suburban service system of the Illinois Central Railway, between 75th Street, Chicago, and Kensington. The railway already has 130 motor-equipped coaches to be operated each with a trailer in two-car units, which may be coupled up into trains of ten-car length when needed. The work on the trolley wires from 39th Street north to Randolph is now being completed.

Freight Trains in Indiana Relieve Airplane Service

Two new freight trains are announced by the Union Traction Company of Indiana. One train leaves Wabash daily at 2:35 p.m., running via Marion and Anderson to Indianapolis, providing next morning deliveries from those points. The leaving time at Marion is 3:30 p.m. Morning freight service from Marion and Wabash will be continued. The additional train is designed to handle shipments made later in the day.

Business handled by airplane and Indianapolis - Detroit fast through freight trains is being supplemented with a special advance section which will leave Muncie daily at 5:30 p.m., running directly through to Fort Wayne, Ind., and Lima, Ohio. This will relieve the regular airplane train, which leaves Indianapolis under the new schedule at 5 p.m. and is expected to improve the growing overnight freight deliveries made between Indianapolis and points in Ohio and Michigan.

Officials of the Union Traction also announce a new schedule on the Anderson-Wabash line, designed to afford better connections at Anderson, Alexandria and Wabash.

Extensive Rerouting in Detroit

A rather extensive rerouting plan which has been under consideration for some time by the Department of Street Railways at Detroit, Mich., was put into effect on May 1, affecting Woodward, Jefferson, Brush, Hamilton and Oakland cars. It is the belief of the Street Railway Commission that the new plan will relieve congestion of traffic in the downtown section. Under the new schedules the number of cars passing through the block on Jefferson Avenue between Woodward Avenue and Griswold Street during the peak hours will be reduced from 286 to 70. On the southbound trips the Brush cars run south on Hastings Street to Farnsworth Avenue, west on Farnsworth Avenue to St. Antoine Street and south on St. Antoine Street. The changes in these latter routes were necessitated by the opening of the new plant of the American Car & Foundry Company on Russell Street, additional service being required to care for the employees of this plant. This is only one of the many changes, but it is typical in that it illustrates the ends sought to be achieved.

Stops Eliminated in Atlanta as Transit Aid

More than 500 eliminations and changes in stopping places on the railway system in Atlanta have just been put into effect under order of the State Public Service Commission following a petition of the Georgia Railway & Power Company. The changes involve the elimination of 345 of the present street car stops, the moving of 144 stops and the creation of 51 new stops on more than a score of routes operated by the company. They come as the result of a movement instigated more than two years ago when the city engaged the services of the Beeler Organization to survey and report upon transportation conditions in Atlanta. For the past six weeks the commission has been conducting hearings on the proposed stop changes, and in addition to studying the Beeler report has had its own consulting engineer go over most of the proposed changes.

In its preamble to the order making the changes effective the following benefits are enumerated by the commission to be derived by the changes:

1. Reduction in running time between 10 and 12 per cent.
2. Reduction in actual number of cars required for given frequency of service from 8 to 10 per cent.
3. Saving of 10 to 12 per cent of car-riding time.
4. Reduction in accidents of all kinds by actual records 33⅓ per cent.
5. Reduction of 8 to 10 per cent in power consumption.

The Public Service Commission states that it will give further consideration from time to time to any complaint made upon the part of the public after sufficient time has elapsed to determine the merits of each change.

Betterment Plans for St. Louis Traffic Awaited

E. R. Kinsey, president of the Board of Public Service of St. Louis, Mo., announced on May 6 that conclusions on the city's whole rapid transit problem would be reported in about three weeks. President Kinsey made this statement following a conference for harmonizing various plans for improvement of the city's traffic situation, both street car and vehicular, in its congested districts.

A special rapid transit committee of the Board of Aldermen has been considering the rapid transit question for more than a year. A subway for downtown St. Louis with elevated lines leading to outlying sections has been suggested.

Advertisements to Flourish in Oakland

The city of Oakland, Cal., has lost its fight to keep advertisements from the outside of street cars. Judge Warren V. Tryon, in the Alameda County Superior Court, has sustained an injunction against the ordinance recently passed by the City Council of Oakland prohibiting the advertisements. The judge ruled that the Council exceeded its police powers when it passed the ordinance on April 8. The Key System Transit Company and the Pacific Railway Advertisement Company the next day applied for the injunction.

The advertising company showed that it had spent $8,000 to prepare street cars for exterior advertising and that it held a contract with the Key System whereby the latter would be paid $40,000 a year for the use of the cars, and further that its contracts with other advertisers would be nullified if the ordinance were allowed to stand. The ordinance was declared confiscatory.

Judge Tryon in his ruling declared that the city of Oakland was empowered to pass ordinances against any plan of advertising that endangered the peace and safety of the citizens. He admitted that the advertisements in question were not pleasing to the eye, but the æsthetic was not a consideration in deciding what constituted the peace and welfare of the citizens.

Accident Prevention Bureau in Brooklyn Formed

An accident prevention bureau has been organized by the Brooklyn-Manhattan Transit Corporation, Brooklyn, N. Y., to assist the surface transportation department in the reduction of accidents. The work will be supervised by a committee consisting of W. S. Menden, president; George D. Yeomans, general counsel; William Siebert, superintendent of surface transportation. A. T. Brophy will act as secretary of the committee. Alfred H. Marsh has been appointed supervisor.

The full co-operation of every one is sought, in an effort to bring about the success of this movement. Each employee has been informed of the purpose and aims of the bureau. In a statement to the men it is said that only by the exercise of the greatest care in the operation of surface cars can the number of accidents be reduced.

Maine Road Threatens to Compete with Electrics

Objection has been raised to the plan of the Boston & Maine Railroad to supplant some of its local trains out of Portland, Me., with bus service. The railroad's idea was to run buses over highways in a roundabout way to its stations. This would put it in competition with the local railway lines of the Cumberland County Power & Light Company and call for the use of buses over roads which are hardly passable at some seasons of the year. Among the objectors are community loving individuals who seek to point out the danger of the unrestricted bus operated in a territory where satisfactory electric railway service is to be had. Typical of letters of protest against the proposed service was one from a resident of Scarboro. This man pointed out the injustice of the proposed service to the existing agency, fortifying the remarks he made with arguments from experience elsewhere. In conclusion he said:

> Let the Boston & Maine serve its territory and keep out of the C. C. P. & L. Co.'s territory. The people are satisfied with the way that company renders service. The road from Dunstan to Old Orchard through Pine Point is narrow and is in deplorable condition in spite of the fact that it costs the state and town about $1,000 per mile a year to maintain. The taxpayers cannot forever stand this and the extra wear and congestion buses will make. Heavy traffic belongs on steel rails, not on highways. Help us to stand by our electric road and leave room for safe travel on the highways. Let the Public Utilities Commission show whether or not it is for public service.

New York State Men Want 10 Cents an Hour More

Following a vote of the employees of the New York State Railways at Rochester to join with the workers of Utica and Syracuse in a demand for a wage increase of 10 cents an hour, and after conferences between union and railway officials, employees in the three cities were at an early date to ballot on new wage and working terms agreed on in these conferences to supplant the present contract, which expired on May 1. The conditions sought to be imposed are not to be revealed until they are submitted to the employees.

If the men reject the proposal offered in behalf of the railway by President James F. Hamilton, the joint board of the union must appeal to Mr. Hamilton for another conference to draft terms.

The Rochester men had discussed a separate contract, believing that in view of the increased fare in their city, they were entitled to higher pay than the men in Syracuse and Utica, where applications for fare increases are pending before the State Public Service Commission.

The balloting in the three cities will be carried on the same day, but independently. The totals will be pooled. Last year Rochester's adverse vote on the terms submitted by the company was overridden by the combined favorable totals of the two other cities.

The present scale in the three upstate cities is 55 cents for two-man car operators, 57 cents for interurban employees and 60 cents for platform men on one-man cars.

The men voted on May 11 to reject the company's proposal.

News Notes

Fares Remain Ten Cents.—The Illinois Commerce Commission and the Illinois Power Company have reached an agreement under the terms of which the existing fare rates in Springfield are renewed. The basic rate of 6¼ cents for token buyers is maintained, but the sale of family books is eliminated. Cash fares remain 10 cents, with two tokens for 15 cents and eight for 50 cents. Children's fare remains 3 cents.

One-Man Cars Only in LaCrosse.—With the extension of one-man car service by the Mississippi Valley Public Service Company to its north side and Sixteenth Street lines on May 2 the entire city of LaCrosse is now provided with cars of the one-man type.

Will Consider New Line.—The Wisconsin Gas & Electric Company is considering the petition signed by residents of the northeast section of Racine, Wis., and presented to the City Council urging the construction of a car line north from High Street. This line would serve this newly developed section of the city and would eliminate the inconvenience now experienced by residents of this section.

"The Orange Line" Chosen.—In a contest conducted among employees of the Wisconsin Power & Light Company through the medium of its house organ, *Power & Light News*, to secure a suitable name or slogan for use on its cars and buses, "The Orange Line" was accepted as the most popular name. Fred Whitely, local manager of the company, and M. C. Alexander, Madison, divided first honors, each having submitted the same name. The new name will be painted on all cars and buses.

Fares Increased.—A 3-cent increase in fares between Carthage and Joplin, Mo., on the Southwest Missouri Railroad, Webb City, Mo., was recently ordered by the Public Service Commission. The increase, in effect, is added between Webb City and Joplin. The fare between those cities now will be 13 cents instead of 10 cents and from Carthage to Joplin the fare will be 38 cents instead of 35 cents. The 3-cent increase was asked in a petition filed last January after the 8-cent city fare went into effect in Joplin. The claim was based on the ground that the same 8-cent fare rate should apply to the Joplin city zone for traffic from points beyond that zone as well as for traffic within the zone.

Tunnel Proposed for Pedestrians.—A plan to construct a tunnel at the corner of Howard and Lexington Streets, Baltimore, Md., for the use of pedestrians has been submitted to the city officials by Mark M. Hardy, president of the Pedestrian Subway Company of America. The corner involved is the most congested in the business section and is passed by several lines of the United Railways & Electric Company. The proposal made to the city is that the subway be built with entrances and exits at all four corners. The subway also would provide space for stores. Mayor Howard W. Jackson, who heard the plan outlined by Mr. Hardy, requested that the details be put in writing so he could place the subject before the members of the Board of Estimate.

Skip-Stop Plan Extended.—The Winnipeg Electric Company put into effect on May 5 the skip-stop system on the Academy Road line (Broadway) in Winnipeg, Man. The new system will provide that street cars stop at every other street outbound, while on the inbound journey they will stop at every street missed on the outward journey. The system is not new in Winnipeg, but has been used for some years on the busiest car lines. The stops are indicated by white poles.

Hearings on Rerouting Scheduled.—The Maryland Public Service Commission has set June 1 as the date to open the hearings on the rerouting of the cars of the United Railways & Electric Company, Baltimore. The application for an order requiring the United to make the changes is sought by the Baltimore Traffic Survey Commission. The proposed changes are contained in a report of the traffic commission made recently. It has been stated by the United that it will agree to the rerouting only if the motorists and others involved in the survey agree to the proposed changes recommended for vehicular traffic.

Postponement of Increased Tariff Ordered.—An order suspending until May 20 the proposed new tariff of the Utah Light & Traction Company, Salt Lake City, providing for an increase in fares, has been issued by the Public Utilities Commission of Utah. If the commission passes upon the application of the company for increased rates before that date, the order will be rescinded and a new one issued in accordance with the determination of the commission. In the meantime, however, fares will remain unchanged.

Three Centennial Transit Bills Up.—Three ordinances affecting transportation service at the Sesqui-Centennial Exposition grounds, Philadelphia, Pa., call for trolley and bus terminals of the Philadelphia Rapid Transit Company and for extension of trackage from present limits of the lines into the grounds. The Mayor is authorized by the ordinances to enter into agreements with the Philadelphia Rapid Rapid Transit Company and the Philadelphia Rural Transit Company, a subsidiary, for the maintenance of the tracks and terminals, which will remain in force until July 1, 1957, the life of the city-company partnership agreement. The work is under way. In addition to the terminals, a second ordinance will arrange for track extensions into the grounds. The third ordinance provides for the removal of tracks in Broad Street between Bigler Street and Terminal Avenue, which will be restored after the celebration closes.

Price of Trip Books Reduced.—The Washington, Baltimore & Annapolis Electric Railroad has been granted authority by the Maryland Public Service Commission to put in effect on June 1 a reduced rate. The five-trip books between Baltimore and the District of Columbia line will be reduced from $11.40 to $10 and the ten-trip books from $22.80 to $19.50.

Recent Bus Developments

Interesting Tour for Sesqui-Centennial Sightseer

To meet the needs of the Sesqui-Centennial sightseer, interested in historical and industrial Philadelphia, Pa., the Philadelphia Rapid Transit Company started three bus tours on May 3. Two of the tours cover greater Philadelphia. The third makes daily trips to Valley Forge. Officials of the company have been working for several months on these tours, and after much research have planned routes which cover the most important historical points in the city.

Tour No. 1, which leaves the P.R.T. waiting room, 237 S. Broad Street, four times daily, includes a trip through historic, business and residential Philadelphia. The cost is $1. The tour consumes 1¾ hours. Tour No. 2 includes greater Philadelphia and Germantown. It consumes 3¾ hours. The cost is $2.50. Two trips are made daily for the Valley Forge tour.

The Mitten Management gas-electric bus, parlor car type, is used on all tours. Trained sightseeing men will accompany these trips. In connection with the tours, the company has issued an interesting folder giving a glimpse of historic Philadelphia and environs.

Buses on Trial in Manitowoc

The proposed plan of the Wisconsin Public Service Corporation to discontinue temporarily its railway service in Manitowoc in favor of city-wide bus service for a trial period of four months was practically accepted by the Common Council when it ordered the street committee of the Council to draw up and submit an ordinance providing for the plan. If the buses do not live up to the claim of the company that they will provide better service the city, in its agreement with the company, is allowed the right to order the return of the street cars. The company also plans to establish a new cross-town bus line on the south side now unserved. A fare of 10 cents will be charged or six tickets for 50 cents. The railway system has been a losing proposition. It is claimed that a fare of 13 cents instead of the present 6 cents would have to be charged if the company were to receive a fair return on its investment. A month's extension from the original proposal for a three months trial was arranged to permit the company to purchase new bus equipment.

Bus Substitution on Outer End of Bergen Line

The Board of Public Utility Commissioners of New Jersey has authorized the Public Service Railway, Newark, N. J., to suspend railway service on the Bergen trolley route between Hackensack and Fairview. The track on which service is to be suspended is the outer end of a long route beginning at the Fourteenth Street terminal in Hoboken. Although known under one name, this was in reality two lines, as there has never been any physical connection across the tracks of the Erie Railroad at Little Ferry. Operation on the outer section has been hampered by congestion in the narrow streets of Hackensack and it is thought that bus operation in this area will be more satisfactory.

The application was made simultaneously with one for approval of local permits to operate twelve buses between and including Hackensack and the Weehawken Ferry, Weehawken, a distance of 11 miles, and on a route which paralleled the railway tracks. This petition was also acted upon favorably by the board, which ruled that both the abandonment of railway service and the installation of the bus served public convenience and necessity. Railway service between Fairview and Hoboken will be continued.

Sightseeing Service in Ottawa

The Ottawa Electric Railway, Ottawa, Ont., plans to operate a sightseeing service with modern bus equipment. The first coach is now nearing completion in the plant of the Ottawa Car Manufacturing Company. This will be the first venture of its kind in Ottawa.

The route which the coach will cover two and three times a day will take in 19 miles of the most beautiful parts of Ottawa and the manufacturing districts of Ottawa and Hull. The new coach is the latest word in that type of vehicle. It will be mounted on a special motor coach body and painted outside in the regular O. E. R. colors. The first coach is to be named "Miss Ottawa."

Major F. D. Burpee, vice-president and manager of the company, states that this department will be expanded just as soon as there is sufficient traffic to warrant it. In addition to the coach for sightseeing purposes, the company is rushing to completion several other buses for its Eastview and Hunt Club services.

Steam Rail May Not Compete with Electric Railway

Massachusetts Department of Public Utilities So Rules—Dissenting Opinion Scores the New Haven Railroad on the Basis of Former Record

IMPORTANT expressions on the issue of railroads engaging in the bus business to the extent of paralleling instead of feeding their rail lines and the wisdom of opening the way for a new competition with the established service of the Boston Elevated Railway are formulated by the Massachusetts Department of Public Utilities.

The case involves the petition of the New York, New Haven & Hartford Railroad, through its subsidiary, for authority to operate a bus line between Boston and Providence.

By a majority vote the department has issued an order permitting the railroad to own and operate the bus line, without the right to do any local business in the territory that is served by the Boston Elevated.

Chairman Henry C. Attwill of the Department of Public Utilities dissents from the decision of his associates in this case. In doing so he stated his views on the law and economics in the situation. He said that he had grave doubts about the propriety of the railroad engaging in the transportation business through such a subsidiary, but that he did not base his dissent upon that at this time. While the certificate issued is a temporary certificate, Mr. Attwill assumed that it was the intention of his associates to make the grant permanent. Unusual zeal was exhibited by the representatives of the railroad, certain residents of North Attleboro, Plainville and Wrentham and the Retail Trade Board of the Boston Chamber of Commerce in their advocacy of the application. On this account Mr. Attwill felt it desirable to state the reasons which led him to dissent from the action of his associates.

It was his view that the Legislature, by providing that it should be unlawful to operate motor vehicles for the carriage of passengers in the manner of a street railway unless a certificate of public convenience and necessity was granted by the Department of Utilities, intended to eliminate unnecessary competition with the existing means of transportation and hoped thus to coordinate the various means of transportation, to the end that unwise duplication, with its consequent waste, might be avoided, so far as was practicable. He said:

> When we grant a certificate merely because there are those who prefer to ride in buses rather than on rails, or because there are those who object to changing from a motor vehicle to a vehicle operated on rails, in the course of their journey, or, forsooth, because a railroad desires to drive out a competitor, we are not, in my judgment, performing our duty as the law contemplates.
>
> I believe that the transportation of passengers in the streets in the areas served by the Boston Elevated Railway system should be done, so far as is practicable, by the Boston Elevated Railway. If we are to permit buses to be operated in the area of the railway system upon the argument that they are not in competition with the Elevated system because the passengers are carried to and from points not in the Elevated area, by the same reasoning we ought to grant any application that may be made by the Eastern Massachusetts Street Railway, the Middlesex & Boston Street Railway or any other transportation company which operates in the vicinity of Boston and which may desire to transport passengers into Boston. If we do not guard zealously the interests of the Boston Elevated Railway system, when is the deficit from operation now assessed against the communities to be repaid, or how are we to have improvements in the system? I appreciate the argument that this line will not take a passenger that now uses the Boston Elevated Railway system or the Eastern Massachusetts Street Railway, but how long will the people of Dedham, Norwood and Westwood be content to see the people of

Walpole and beyond enjoying transportation to and from Boston by means of their highways while such transportation is denied to them?

It was his judgment the granting of this certificate would inevitably be followed by a demand that motor vehicles passing through Westwood, Dedham and Norwood furnish the people of those communities facilities to and from Boston, or that the Eastern Massachusetts Street Railway furnish like facilities. He said that if this demand be met, it means the taking away from the Elevated system passengers who ride on the Eastern Massachusetts Street Railway and transfer to the Elevated system. On this point he said:

If others, who have an equally meritorius case, are authorized to operate their motor vehicles into the center of Boston, it means a very serious diminishing of passengers carried on the Boston Elevated Railway system. In addition to the serious menace to the Elevated system, in my opinion the granting of this petition means the beginning of a conflict between the railroads and the street railways for passenger traffic on the highways. Nor do I believe it in the interest of the public or the railroad that the application should be granted.

He was unable to visualize how a railroad can carry passengers by motor vehicles any cheaper than others.

At the hearing it was contended by the petitioners that to operate trains so as properly to care for the passengers going by motor vehicles to Dedham would increase the cost of train operation between Dedham and Boston by $75,000 a year. Mr. Attwill assumed by this that it is contemplated by the railroad to operate buses between Dedham and Boston more frequently than trains are now operated. He doubted the wisdom of adding to the already congested condition of the Boston highways when adequate means were at hand to avoid it.

Finally, he was not convinced that under the statutes authorizing railroads to operate motor vehicles the commission was warranted in granting this application. Chapter 135 of the acts of 1925 provides for the insertion in chapter 180 of the General Laws of a section, to be numbered 70A, under the heading "Auxiliary Services." It is by this section that the railroad obtains its authority to operate motor vehicles. He said:

I do not believe it was the intention of the Legislature that railroads should engage in what is to all intents and purposes a street railway business. The proposed bus line is not to be operated as an auxiliary to the train service. It is not proposed to operate the motor vehicles to connect with existing train service along the route. In fact, the contrary appears to be the purpose. It is proposed to operate the line in the manner of a street railway in competition with its own rails. The results of the street railway operations by this railroad in the past have not been such as to inspire confidence in its proposed activity in street transportation. In my judgment, the main purpose of this operation is to drive out by competition the interstate bus lines now operating between Providence and Boston. This, in my opinion, is not a sufficient warrant for the granting of a certificate. I think that the railroad can better improve its financial condition by devoting its energies to the improvement of its rail service than by operating agencies which are bound to impair that service.

I do not wish to be understood as saying that a railroad should not operate motor vehicles on the highways in substitution of trains where the patronage is such as not to warrant the operation of the train. When this is done, however, I believe that through rates and service in connection with the system of the railroad should apply substantially as if the service were entirely by rail.

Dissenting Commissioner Scores New Haven Railroad

THE proposed bus line is not to be operated as an auxiliary to the train service. It is not proposed to operate the motor vehicles to connect with existing train service along the route. In fact, the contrary appears to be the purpose. It is proposed to operate the line in the manner of a street railway in competition with its own rails. The results of the street railway operations by this railroad in the past have not been such as to inspire confidence in its proposed activity in street transportation. In my judgment, the main purpose of this operation is to drive out by competition the interstate bus lines now operating between Providence and Boston. This, in my opinion, is not a sufficient warrant for the granting of a certificate.—*Mr. Attwill.*

Interurban Emphasizes Its Bus Service

Appreciation is fast growing of the extent of the bus operation of the Union Traction Company of Indiana. At the present time the company is operating bus lines out of Indianapolis to Peru by the way of Kokomo and a separate line from Indianapolis to Noblesville, and another line is operated from Indianapolis to Muncie via Anderson, and a line from Anderson to Marion. An Anderson city line is operated from the downtown area to the Remy factory No. 1. Buses and bus lines are Union Traction property and are intended to furnish a co-ordinate passenger service. In this connection the company has recently explained that it is worth while for all employees to recognize this phase of transportation as Union Traction property and to aid and co-operate in bus service as well as car service. Bus service for special parties is available at all times.

Bill to Regulate Interstate Buses Passed by Senate

The Senate has passed the bill to regulate interstate commerce by bus operated for hire through the interstate tunnel now being constructed under the Hudson River between New York City and Jersey City and over the interstate bridge now being constructed across the Delaware River between Philadelphia and Camden, N. J. Senator Reed, the sponsor of the bill, said that the bridge would be opened on July 1 and that if some measure of the kind were not passed the value of these highways to the public might be destroyed by the congestion of traffic that would result. He argued that no other state was interested and that all the parties were agreed on the bill. The measure simply vested in the Public Service Commission and the Bridge and Tunnel Commission the right to control the number of buses to be permitted to use the tunnel and the bridge. The highway facilities afforded by the tunnel and the bridge have been provided entirely by money raised by the states. According to Mr. Reed the measure advocated by him simply proposed that Congress delegate to a local commission the power to regulate, subject to Interstate Commerce Commission review, the flow of interstate commerce across these two rivers. Reservations made in the bill distinctly provided that any order made by the I. C. C. should supersede all rulings by the local authorities.

Establishes More Lines in Fond du Lac.—The Wisconsin Power & Light Company started the operation of two more cross-town bus lines on May 10, to supply twenty-minute service with transfer privileges to residents in the southeast and northeast parts of Fond du Lac. This territory is not served by the railway. Not so long ago a cross-town bus line was established between the eastern and western parts of Fond du Lac.

Ten Cents Cash Authorized.—An increase in fare on all bus lines operated by the Santa Barbara & Suburban Railway, Santa Barbara, Cal., was authorized recently by the City Council. The cash fare is now 10 cents against the old fare of 8 cents. No change was made in the 7-cent, five for 35 cents token rate, or the weekly pass for $1. The application was made to the City Council, which alone has the power of granting such permits wholly within the municipality.

Pays for Bus Deficit.—The County Commissioners of Multnomah County, Oregon, have paid $450 to the Portland Electric Power Company to cover the deficit in operation to that company in running buses to Marquam Hill during the first quarter of 1926. Service by bus was stipulated in the government's decision to locate the $1,250,000 veterans' hospital on that site in Portland.

Will Supplement Rail Service.—Application for permission to operate a bus line from Logan, Utah, to Preston, Idaho, has been filed with the Public Utilities Commission of Utah by the Utah-Idaho Central Railroad. The application sets forth the fact that the public may be more adequately served if buses supplement railway service.

Service with Double-Deck Buses in Boston. — Double-deck buses invaded Boston, Mass., on May 8. Leaving the entrance to the Fenway at Charlesgate East at 8 a.m. the first trip was made down Boylston Street to Charles and thence to Bowdoin Square and return. The round trip consumes 40 minutes. Newspaper men, photographers, officials of the Elevated, and Joseph Phillips, representing the makers of the new bus, made the official first trip. The new bus is an experiment. The degree of its success will regulate any action taken to increase this service.

New Route Planned.—The Gardner & Templeton Street Railway, Gardner, Mass., has been granted a license to operate buses from Gardner to the Athol Fair Grounds, which is the terminal of the Athol & Orange Street Railway. The running time between the two points is 1½ hours. This new route was planned with a view to stimulating patronage on the Athol & Orange Street Railway. The bus route will bring people east of Athol to that center for pleasure and to trade.

Financial and Corporate

Governing Body at Chicago to Act as Protective Committee

The governing committee of the Chicago City & Connecting Railways Collateral Trust has announced that it had unanimously recommended the action taken by the owners and holders of the sinking fund 5 per cent gold bonds and participating certificates of that company through protective committees.

Pursuant to this recommendation the governing committee, consisting of Bernard E. Sunny, chairman; Roger A. Baldwin, secretary; Henry H. Porter, Rufus C. Dawes, Samuel M. Felton and Charles Day, which owns or represents owners of substantial amounts of these collateral trust bonds, has consented to act as a protective committee with respect to the bonds for the purposes set forth in a deposit agreement dated Feb. 1, 1926.

The action was taken to enable the committee to deal with the important questions presented by the maturity on Jan. 1, 1927, of $20,616,000 of the 5 per cent bonds; by the maturity on Feb. 1, 1927, of nearly $40,000,000 par value outstanding underlying first mortgage bonds of the Chicago City Railway and the Calumet & South Chicago Railway, and by the expiration by limitation on Jan. 21, 1927, of the street railway franchises that are now in force.

The deposit agreement among other things provides that in event of there being formulated a plan for a comprehensive unified system of transportation for the city of Chicago or any similar plan which is acceptable to the committee, copies of the plan will be filed with the depositaries and notice given to the depositors, who shall have the right to file dissents from such plan or to withdraw from the agreement, which they will be at liberty to do upon the terms that are stated in the agreement.

Revenues on Salt Lake City Property Increase

Operating revenues of the Salt Lake & Utah Railroad, Salt Lake City, Utah, which went into the hands of a receiver on July 25, 1925, were $734,035 for the year 1925, an increase of $27,392 over the previous years. The operating expenses, according to a report filed with the Public Utilities Commission of Utah, were $579,931, an increase of $73,840. The ratio of operating expenses to operating revenues was 79.01 per cent. The taxes paid were $62,330, of which $20.65 was to the federal government.

The total amount that was invested in road and equipment on Dec. 31, 1925, was $7,378,866, an increase of $37,471 over the previous year. The debit balance transferred to profit and loss was $60,426, a decrease of $108,452 over the previous year. The length of road owned is 75.14 miles and the average investment per mile is $104,146, while the length of track owned is 97.40 miles, with an average investment of $80,344 per mile of track. The total par value of capital stock outstanding on Dec. 31, 1925, was $5,043,700.

W. C. Orem, president of the Salt Lake & Utah Railroad, in commenting on its present condition and prospects for increased business, stated that during the months of March and April of the present year the passenger business of the road had increased considerably over the corresponding period for each of the past five years, and that it has far surpassed the business of the similar two months last year. He further stated that the road is getting back to a healthy condition, with freight business on the increase.

Proxies Asked for New York & Harlem Meeting

A committee composed of Ernest Sturm, William D. Scholle and Edwin Thorn, representing stockholders, has sent out letters to stockholders of the New York & Harlem Railroad, New York, N. Y., asking for proxies for the annual meeting on May 18. The letter says that sale of the railway line was approved at the stockholders' meeting on April 23, the New York Central's votes assuring that result. Disposition of the avails of such sale was not determined at that meeting. The committee was represented at the meeting and expressed the view that this money should be paid to the Harlem stockholders. The letter adds:

> The use to which these avails shall be put, the real estate situation, the relationship under the lease and other allied matters make it desirable that the minority "Harlem" stockholders should remain firmly banded together, as we always have been since the formation of your committee, to the end that the interests of the minority stockholders should be protected.

Kansas City Affairs Reviewed

Gross Income in 1925 Before Interest Charges Was $1,262,634—Reorganization Committee Brings Out Many Interesting Facts—Reference Made to Bus Operations

AFFAIRS of the Kansas City Railways, Kansas City, Mo., in the past twelve months in connection with the reorganization are revived in a circular issued by the reorganization committee, M. A. Traylor, chairman. In 1925 gross income before interest charges was $1,262,634, while in 1924 it was $1,256,430. The statement of earnings for the years 1925 and 1924 follows:

STATEMENT OF EARNINGS OF THE KANSAS CITY RAILWAYS

	1925	1924
Total railway operating revenue	$9,777,958	$10,024,230
Total motor coach operating revenue	189,621	.....
Miscellaneous rents, etc.—non-operating	26,902	17,937
Interest on securities owned	223,394	181,450
Total revenue from all sources	$10,217,875	$10,223,617
Total operating expenses and taxes	8,955,241	8,967,187
Gross income before interest charges	$ 1,262,634	$1,256,430

The operating expenses shown above include annual charges of $1,200,000 on account of personal injury and property damage claims and $120,000 on account of receivers' and legal expenses. These two items, aggregating $1,320,000 a year, represent an appropriation of $110,000 each month from Nov. 1, 1921, to date and charged to operating expenses. Adjusting these and other similar items to the actual expenditures, the gross income for 1925 was $1,975,244 and for 1924 $1,911,926. If from these latter figures are deducted the revenue received from interest on securities owned, which do not represent normal earnings from the property, the final adjusted gross income for 1925 was $1,751,850 and for 1924 $1,730,476.

In the first three months of 1926 the total revenue from all sources as compared with the first quarter of 1925 showed an increase of $58,941 and gross income before interest charges a decrease of $130,907. This decrease is due in large part to unprofitable bus operation during the winter months, with traffic light and expenses of bus operation at maximum.

The rates of fare over the street car lines have continued at 8 cents cash, two tokens for 15 cents, five tickets for 35 cents, averaging approximately 7½ cents per revenue passenger. The fare on the express bus line is 25 cents and on other bus lines 10 cents with certain transfer privileges.

The federal court having jurisdiction in the railways receivership proceedings rendered a decision, on Dec. 30, 1924, upholding the validity of the first mortgage and of the first mortgage securities against the attacks of the second mortgage bondholders, other contesting creditors and preferred stockholders, and directing a foreclosure of the first mortgage.

Under date of May 15, 1925, a final decree was entered foreclosing the first mortgage and directing a sale of the property and franchises of the company in satisfaction of the debt.

The preferred stockholders' committee and a large creditor of the company

EARNINGS ON NEW SECURITIES OF THE KANSAS CITY RAILWAYS

Adjusted gross income as above for the year 1925	$1,751,850
Interest requirements under the plan of reorganization—6 per cent on $12,465,200 new first mortgage bonds	747,912
Amount applicable to new preferred stock	$1,003,938
Annual dividends on 83,364 shares of preferred at $7 a share	583,548
Balance after preferred dividends	$420,390

have appealed from this final decree to the Circuit Court of Appeals for the Eighth Circuit, where appeals are still pending.

Promptly after entry of the final decree the reorganization committee promulgated and adopted a plan for the reorganization of the railway, which was unanimously approved by the first mortgage bondholders' and collateral noteholders' protective committees. The plan was thereupon issued under date of June 1, 1925, and copies sent to all depositors with the protective committees and to all known holders of non-deposited first mortgage securities. This plan was accepted and approved by depositors with the protective committees without a single exception and a large number of non-depositors also joined and deposited their securities. In consequence, there is now on deposit with the reorganization committee approximately 96.6 per cent of the outstanding first mortgage securities, aggregating approximately $24,200,000 principal amount out of approximately $25,000,000 principal amount of such securities outstanding.

The plan has been submitted to the Public Service Commission of Missouri as required by law, and under date of Dec. 12, 1925, the commission authorized the issuance of the new securities provided therein upon the new company being vested with the property. This plan was thereupon declared operative by the committee on Dec. 18, 1925.

The reorganization committee has received during the past several months a partial payment on account of the first mortgage securities under order of the federal court in the amount of approximately $1,500,000 and has applied a large part of this fund to the purchase of the judgments for personal injury and property damages and to settlement of the claim of the Kansas City Terminal Railway in accordance with the terms and provisions of the plan.

In accordance with the terms of the final decree and by order of the federal court the properties and franchises of the railway in Missouri and Kansas were offered for sale at auction by the court's commissioner on Jan. 4, 1926, and were bid in by a representative of the reorganization committee for the sum of $8,000,000, the sale being subject to confirmation by the court.

The second mortgage bondholders' committee and preferred stockholders' committee filed objections to the sale and opposed confirmation. Hearings on these objections have been held before the court within the past few days and the case taken under advisement. The reorganization committee understands that, in case the sale be confirmed, the contestants will probably appeal to the upper court. In consequence of these pending legal proceedings and other matters involved in the reorganization, the committee is unable to predict when the receivership will terminate, when the properties will be turned over to the new company and when the new securities will be issued. The committee will, however, endeavor to effect the reorganization with all reasonable promptness.

The receivers of the railway have installed a comprehensive system of motor coach lines to supplement the railway system. These lines consist of through trunk lines, feeder lines and express service to the outlying sections of the city. About 65 buses are now in operation. These lines are operated under a three-year franchise granted by the city. Service over all franchise routes was installed in November, 1925. The reorganization committee advocated the installation of these bus lines as a means of affording additional transportation facilities with a unified system.

Revenue on Connecticut Company's Lines Higher

In the fifty-fourth annual report of the New York, New Haven & Hartford Railroad to the stockholders E. J. Pearson, president, states that the favorable result of the year for the New Haven, and for the railroads of the country as a whole, has been largely due, although generally not so recognized, to more than normal traffic, reduced cost of fuel and some supplies and the absence of any unusual difficulties affecting transportation or industry.

During the year rail service was discontinued on 38.5 miles of road of the Connecticut Company, including 15.9 miles of electrified steam road between Tafts and Central Village, and bus service substituted. These lines, excepting the electrified steam road, were faced with the necessity for extensive track rehabilitation due to pavement construction, and, by reason of their low earning capacity, these expenditures were not warranted. There were also added 64.55 miles of bus routes serving new territory. The combined bus and rail operation shows a slight increase in revenue over the previous year.

On the New York, Westchester & Boston Railway 10,154,199 passengers were carried during the year, an increase of 1,056,489. Of this increase about 200,000 were handled through the Harlem River Terminal, taking advantage of the improved facilities mentioned in the 1924 report. The extension of the road from Larchmont to Mamaroneck was opened for business on March 21, 1926.

The accompanying table shows the income account of the electric railway properties of the New York, New Haven & Hartford Railroad during 1925 compared with the previous year.

Receiver's Rights in Rockford Questioned

The battle over the disposition of the properties of the Rockford City Traction Company, Rockford, Ill., and affiliated interurban lines began recently in the Circuit Court with prospect of developing into a lengthy legal clash over settlement. Adam Gschwindt, receiver, was denied the right to petition the court to sell real estate of the road or to abandon the Freeport, Beloit & Janesville lines. The final order was not entered by Judge E. D. Shurtleff, who will return later to hear further arguments in the case. The court held that the receiver's petitions could not be considered because, as a non-partisan officer of the law, it is not within his province to become a party to litigation of property in his custody.

The receiver had petitioned the court that first mortgage bondholders of the Rockford & Interurban line, second mortgage bondholders of the Beloit and Janesville lines and second mortgage bondholders of the Freeport lines should have the physical property of the lines returned to them. Mr. Gschwindt suggested that these bondholders either guarantee the deficit on each line or have their own respective receivers appointed. The second petition sought authority to sell real estate owned by the traction system but not required in operation of the lines. It is believed that petitions representing both these

	Connecticut Company		Berkshire Street Railway		New York, Westchester & Boston Railway		New York & Stamford Railway		Westchester Street Railroad ¶	
	Year 1925	Comparison with 1924 Increase or *Decrease*	Year 1925	Comparison with 1924 Increase or *Decrease*	Year 1925	Comparison with 1924 Increase or *Decrease*	Year 1925	Comparison with 1924 Increase or *Decrease*	Year 1925	Comparison with 1924 Increase or *Decrease*
Total operating revenues	$14,522,176	$147,338	$858,875	*$69,703*	$1,648,900	$127,454	$517,949	$4,142	$221,911	$5,262
Total operating expenses	11,585,187	*5,548*	749,647	*24,422*	1,060,438	67,242	385,258	*8,893*	192,277	*17,478*
Net operating revenue	$2,936,989	$152,886	$109,228	*$45,280*	$588,462	$60,212	132,691	$13,035	$29,633	$22,740
Tax accruals	630,327	41,871	20,144	*18,994*	216,287	6,271	23,346	*1,349*	11,301	*1,358*
Operating income	$2,306,661	$111,015	$89,083	*$26,286*	$372,174	$53,941	$109,344	$14,385	$18,332	$24,099
Non-operating income	50,758	324	6,161	4,384	6,971	*3,655*	855	*2,950*	630	*545*
Gross income	$2,357,420	$111,340	$95,245	*$21,902*	$379,146	$50,285	$110,200	$11,434	$18,962	$23,553
Deductions from gross income	1,491,946	*51,665*	*$302,710	7,728	‡2,051,947	88,157	$*113,567	1,512	‖31,704	*1,732*
Net income	$865,474	$163,005	†$207,465	*$29,630*	†$1,672,800	*$37,871*	†$3,367	$9,922	†$12,741	$25,286

* Deductions from gross income include $209,980 interest accruing to the New York, New Haven & Hartford Railroad but not included in the income account of that company.

† *Deficit.*

‡ Deductions from gross income include $1,100,008 interest accruing to the New York, New Haven & Hartford Railroad but not included in the income account of that company.

§ Deductions from gross income include $40,225 interest accruing to the New York, New Haven & Hartford Railroad but not included in the income account of that company.

¶ This company is entirely separate from the New York, Westchester and Boston Railway. Road in hands of receiver from Feb. 29, 1920—receiver's account included.

‖ Deductions from gross income include $26,858 interest accruing to the New York, New Haven & Hartford Railroad but not included in the income account of that company.

actions will be renewed in the name of the committee of bondholders. Eleven pieces of property owned by the Rockford City Traction Company and estimated to be worth $300,000 have been offered for sale.

Trading Starts in New St. Louis Securities

Trading in the securities of the St. Louis Public Service Company, the proposed successor to the United Railways, was started on the St. Louis Stock Exchange on May 3. Initial sales of the common were at $17.50 to $17.75.

On May 1 the interests which will control the new company made an initial payment of about $1,450,000 on the 343,645 shares of new common.

Holders of the 163,830 shares of United Railways preferred had the privilege of buying three shares of the new common at $12.50 for each two shares of preferred held. Holders of the $9,790,000 Transit Company bonds had the right to buy ten new shares at $12.50 for each $1,000 bond held.

Such common stock in the new company not purchased by the United Railway preferred stockholders and Transit bond owners under their option privileges will be offered to the holders of the 249,139 shares of United Railways common stock, 72 per cent of which is owned by North American Company.

The payments made on May 1 were on the basis of $4.50 a share. Another payment of $4 will be due on July 1 and a third payment of $4 at some date not yet set. The total revenue from the sale of the new common stock will be $4,295,562.

The refinancing of the railway properties is based on the expectation that the company will be granted a service-at-cost franchise from the city that will permit it to earn 7 per cent return on a valuation of $57,000,000.

The initial trading in the new stock was slightly above the price that prevailed on the United Railways preferred stock, which carried the privilege of purchase of the new stock. The preferred had been selling for $7. Holders had the privilege of buying the new stock on the basis of $12.50 a share. On this basis the new stock had a tentative stock market value of $17.17.

6 per Cent Preferred Issue for Illinois Power & Light

A special meeting of stockholders of the Illinois Power & Light Corporation, Chicago, Ill., has been called for July 14 for the purpose of approving a change in the dividend rate upon the unissued 70,000 shares of the preferred stock of the corporation from 7 per cent to 6 per cent per annum.

The new issue will have the same rights, privileges, preferences and restrictions as the present 7 per cent issue. The only difference between the two issues will be in the dividend rate.

The officers and directors believe that in the interests of the present holders of preferred stock of the corporation and of the corporation itself, advantage should be taken of the improved conditions which make it possible to dispose of a 6 per cent preferred stock on a satisfactory basis.

Earnings in Akron Higher in 1925

Earnings from transportation on the lines of the Northern Ohio Power & Light Company, Akron, Ohio, for the year ended Dec. 31, 1925, increased to $6,177,542; for the year previous these earnings were $5,364,189. A study of the sources of gross earnings during the past several years shows that the earnings in this department, with a few years excepted, have increased gradually. An increase of 2,468,025 revenue passengers was shown for the year 1925; 160,823 tons of freight were handled and the gross revenue for this kind of business increased from $498,970 in 1924 to $647,712 in 1925. These facts were contained in the report to the stockholders for the year ended Dec. 31, 1925.

The company continued its policy of expending large sums of money on additions and betterments with $1,645,919 for use in the transportation department. The most important expenditures included the purchase of 33 single-deck buses of improved type for operation in city and interurban service, the purchase from competitors and other bus operating companies of 38 buses of various types, construction in the interurban division of 18,100 ft. of single track, double tracking interurban line between Canton and Massillon, rebuilding and equipping 103 electric passenger cars for one-man operation and the purchase of six new freight trail cars, together with the rebuilding of four passenger cars into freight motor cars.

There were many new developments in the transportation department. A franchise covering operations in the city of Akron was approved in November, 1924.

The report refers to the expansion of the customer-ownership idea and to the consistent growth of this partnership between the people of northern Ohio and the Northern Ohio Power & Light. During 1925 the company began the group life insurance plan, providing for its employees, in service a year or more, a life insurance free of cost. The pension fund at the end of the year totaled $52,929 in cash and investments, an increase of $2,297 over 1924. The company continued its systematic safety and accident prevention program in all of its departments with gratifying results. Notwithstanding a considerable increase in car and bus miles operated in 1925 over 1924, and notwithstanding an increase in registration of automobiles of approximately 30 per cent, the records show that not a single passenger or trainman was killed on the entire system during the past three years.

On Feb. 9, 1926, a resolution was passed by the directors to amend the articles of incorporation so as to change the company's corporate name to Northern Ohio Power & Light Company. This amendment was submitted to the stockholders and approved by them at a special meeting held on March 15, 1926. The report says the directors deemed it advisable to make this change in name in view of the fact that the electric light and power business had become such an increasingly important factor in the affairs of the company.

The accompanying statements show the income and expenses for 1925 as well as the traffic carried for 1925 and four previous years on the city system and interurban systems.

COMPARATIVE STATEMENT OF EARNINGS OF THE NORTHERN OHIO POWER & LIGHT COMPANY

	1925	1924
Gross Earnings:		
Electric	$5,322,156	$4,716,808
Transportation	6,177,541	5,364,189
Total	$11,499,698	$10,080,997
Operating expenses and taxes:		
Operating expenses	$7,618,402	$7,161,533
Taxes	822,000	741,900
Total	$8,440,402	$7,903,433
Gross income	$3,059,296	$2,177,563
Interest and other fixed charges	1,557,841	1,441,966
Net income available for dividends and retirement reserve	$1,501,454	$735,596
Dividends on preferred stock	437,334	431,750
Balance	$1,064,119	$303,846
Ratio of operating expenses to gross earnings, per cent	66.25	71.04
Ratio of operating expenses and taxes to gross earnings, per cent	73.40	78.40

STATEMENT OF PASSENGERS CARRIED BY NORTHERN OHIO POWER & LIGHT COMPANY

Calendar Year	Revenue Passengers Carried—Rail and Buses	
	City Systems	Interurban Systems
1921	47,799,437	16,820,442
1922	50,632,248	17,117,064
1923	54,112,423	16,784,535
1924	48,563,053	14,478,984
1925	51,352,849	14,266,754

Small Increase in Passengers in Baltimore

A comparison of street car passengers carried by the United Railways & Electric Company, Baltimore, Md., for the first quarter of this year, as against the corresponding period of 1925, is noted below:

	1926	1925	Per Cent Increase or Decrease
January	18,952,322	18,764,851	+ .99
February	17,458,793	17,620,805	— .92
March	19,760,440	19,213,695	+ 2.85
	56,171,555	55,599,351	+ 1.03

$1,700,000 of Equipment Trusts Offered

Mercantile Securities Company, San Francisco, Cal., is offering for subscription $1,700,000 of 5½ per cent equipment trust gold certificates of the Key System Transit Company, Oakland, Cal., issued under the Philadelphia plan. The certificates are dated April 1, 1926, and mature serially, the final maturity being April 1, 1938. Prices vary from 100.48 for the earliest maturity, namely, April 1, 1927, to 97.01 for the last maturity, and the yields vary from 5 per cent to 5.85 per cent. The certificates are issued in part payment for 29 double-truck motor passenger cars and two double-end steel turbo-electric ferryboats.

All of the equipment will be new and will cost not less than $2,153,561, of which an initial payment of $453,416, representing more than 20 per cent of

the cost of the equipment, will be paid by the railway. Under the terms of the lease the company will pay a rental sufficient to cover dividend warrants, annual maturities and all other charges as they fall due. The Key System Transit Company provides transportation service for Oakland, Berkeley, Alameda and other cities on the eastern shore of San Francisco Bay.

Illinois Interurban Ordered Sold

Assets of the Alton, Granite & St. Louis Traction Company and the Alton Gas & Electric Company have been ordered sold by Judge Lindley of Danville, Ill., sitting in the United States District Court at East St. Louis, Ill., following a hearing on a bill to foreclose a mortgage on the properties. The mortgage was security for a bond issue of $2,496,000 floated in 1904.

Both companies have been in receivership, the traction system since 1920 and the gas and electric properties since last December. Thomas W. Gregory, vice-president of the East St. Louis & Suburban Railway, is receiver for both companies. The traction company operates an interurban line from Alton, Ill., to St. Louis, Mo. At the hearing before Judge Lindley, Mr. Gregory stated that no interest had been paid on the traction company's bond issue of $2,496,000 since the receivership proceedings were instituted. He expressed the belief that the plants and lines of the companies could be grouped and sold as units. The indebtedness of the two companies is about $4,000,000.

Peter P. Schafer, Champaign, Ill., has been appointed special master to conduct the sale.

Dayton Company Moves Offices.—The Cincinnati, Hamilton & Dayton Railway, which has purchased the railway property of the Cincinnati & Dayton Traction Company, has announced the removal of its general offices to 928 Third National Building, Dayton, Ohio. J. H. McClure is vice-president and general manager of the new property.

Wants Less Equipment in Service.—The Cairo & St. Louis Railroad filed an application with the City Council of Cairo, Ill., recently seeking permission to discontinue operation of four of its street cars in Cairo. Three of the cars, which it is proposed to discontinue, operate on regular schedule in the business district, while the other is an "owl" car. The company contends that its revenues continue to decline.

Would Substitute Buses.—The Central Illinois Traction Company has filed a petition with the City Council of Paris, Ill., seeking to discontinue railway service there. At one time the lines were a paying proposition, but the automobile has ruined the business, according to the statement. The company asks the right to operate buses over the streets now occupied by its tracks.

$975,438 Allowed in Condemnation Case.—Supreme Court Justice O'Malley at New York has awarded $975,438 to the Interborough Rapid Transit Company and Manhattan Railways in consideration of $4,200,000 in claims for condemnation by the city of the 42d Street elevated spur. The company claimed $3,600,000 for easements of light, air and access surrendered, but received $750,000; its franchise was held at $100,000 and the award was $25,000; its physical value was placed at $185,513 and $120,438 was awarded. The spur that was removed extended west from Third Avenue for a distance of several blocks to the junction of Fourth Avenue with 42d Street at the Grand Central Station.

Railway Effects for Sale. — H. E. Salzberg Company, Inc., which recently purchased all the physical assets of the former New York & Long Island Traction Company, New York, N. Y., has announced that it will offer for sale all the recently acquired equipment. The effects for sale include Birney cars, Brill cars, Southern cars, sweepers, snow plows, work cars, materials and supplies, machine shop equipment, track tools and approximately 40 miles of track and overhead material. The Salzberg Company deals in new and second-hand electrical and steam machinery at 50 Church Street, New York City.

$8,312 Added to Stabilizing Fund.—The Des Moines City Railway, Des Moines, Iowa, added $8,312 to its stabilizing fund in March, according to the monthly report, bringing the fund to $8,381. Total revenue for the month was $213,253 and passengers numbered 2,188,838. The fund has to reach $150,000 before a fare decrease will be possible.

Condensed Data on Barstow Utility Properties.—"Public Utility Properties of General Gas & Electric Corporation" has been issued by W. S. Barstow & Company, Inc., financial and operating managers. This is a book of 146 pages containing information regarding public utility companies with yearly gross earnings of approximately $21,500,000 after intercompany eliminations. A thorough description of each property is given, together with its latest income account and an explanation of its capitalization.

Revenue Exceeds Expenses.—For the month of March, 1926, the revenue of the Boston Elevated Railway, Boston, Mass., exceeded the cost of service by $161,773, against $211,956 in March, 1925. The number of revenue passengers totaled 33,802,662, against 32,338,441. Total miles operated, including bus-miles, amounted to 5,045,642, against 4,798,747 in March, 1925.

$7,000,000 Valuation Item Fought.—Arguments have been completed in the Circuit Court of Baltimore on a petition which seeks to restrain the Maryland Public Service Commission and the United Railways & Electric Company from including a valuation of $7,000,000 on easements of the company in the valuation placed on the property. In a recent hearing covering several months the commission included the $7,000,000 item in the total valuation of $77,000,000. The petition was filed by Clarence W. Miles, formerly people's counsel, before the Public Service Commission. Since the conclusion of the case before the commission he has resigned. Linwood L. Clark, representing the People's Corporation, also appeared in the court case and argued against an item of $8,560,210 allowed for going value. Thomas J. Tingley, newly appointed people's counsel, also appeared in the case. Edwin G. Baetjer, Joseph G. France and Attorney-General Thomas H. Robinson appeared for the defendants.

Georgia Light Rumor Corrected.—Published accounts that Cities Service Company had secured a substantial interest in the stock of the Georgia Light, Railway & Power Company are stated to be erroneous. It is understood, however, that H. L. Doherty & Company has secured a stock interest in the company which is not a controlling interest.

Nebraska Read Would Discontinue 8 Miles.—The Omaha & Lincoln Railway & Light Company, Lincoln, Neb., has asked permission of the State Railway Commission to abandon that part of its interurban lines between Ralston and Papillion, a distance of 3.9 miles, and to substitute bus service. It also desires to withdraw railway service on its 4-mile line between 26th and N Streets, Omaha, and Ralston, with the exception of two cars a day to be operated solely for the purpose of holding the franchise. Partial service on this stretch has been given by buses, and the full schedule will be so maintained hereafter if approval is received. The Ralston-Papillion line traverses a highway that is about to be surfaced. Traffic over the railway is alleged to be insufficient to pay expenses of operating this section.

Messrs. Gannon and Smith on St. Louis Board.—Frank A. Gannon and J. Sheppard Smith were elected directors of the United Railways, St. Louis, at the annual meeting, succeeding Murray Charleton, resigned, and John I. Beggs, deceased. Other directors were re-elected.

May Abandon One Line.—The Jamestown Street Railway is planning the abandonment of the Willard Street line from Winsor Street to the city line in Jamestown, N. Y. According to the company officials, the line, which was opened in 1914, has never produced sufficient revenue to warrant the maintenance of service. Another factor entering into the situation is the large expenditure the company is making for the repair of pavements between the rails on various streets.

Gross Corporate Income Increases.—The San Francisco, Napa & Calistoga Railway, operating in Vallejo, Napa, St. Helena and Calistoga, reports to the California Railroad Commission its 1925 operating revenue at $246,913, compared with $275,280 for 1924. The operating expenses, excluding taxes, for 1925 were $157,322, and $186,069 for 1924, leaving net operating revenue of $89,591 for 1925 and $89,210 for 1924. During 1925 taxes charged to operation were $16,928 and for 1924 $22,838. Deducting the taxes leaves operating income of $72,662 for 1925, and $66,372 for 1924. Adding the non-operating income of the company to the operating income, results in a gross corporate income, which represents the amount available for interest, amortization of debt discount, other fixed charges, non-operating expenses, dividends and surplus, of $76,383 for 1925 and $70,508 for 1924.

Personal Items

Thomas Pumfrey Chief Engineer of Oregon Property

Thomas Pumfrey has been appointed chief engineer of the Portland Electric Power Company, Portland, Ore., in entire charge of maintenance of way and equipment for the city lines, buses and interurban lines. The office of master mechanic, which has been vacant since the recent death of Frank B. Willis, will be abolished.

Mr. Pumfrey has had charge of the maintenance and way departments for sixteen years with supervision over construction and maintenance of tracks, roadways, bridges, buildings and over all engineering and draughting work. In addition to those duties he will now have entire charge of all rolling stock.

Before he went with the Portland Electric Power Company, Mr. Pumfrey served as chief engineer of the International Railway, Buffalo, N. Y., from 1899 to 1910.

Illinois Traction Appointments Announced

Five promotions in the personnel of the Illinois Traction System are announced by L. B. Martin, general superintendent, Springfield, Ill.

J. H. Morris, who has been superintendent of the southern division at Staunton for several years, is promoted to be superintendent of transportation, with headquarters at Springfield, vice A. S. Bergschneider, resigned.

O. C. Genung is advanced to fill Mr. Morris' place as superintendent of the southern division with headquarters at Staunton, Ill.

S. W. Haberle, who has been chief dispatcher at Mackinaw Junction, Ill., is appointed superintendent of the northern division, with headquarters at Mackinaw Junction, to succeed Mr. Genung.

C. F. Warren is to be chief dispatcher at Mackinaw Junction in place of Mr. Haberle.

B. C. Leach is appointed chief dispatcher at Staunton, Ill.

Mr. Morris, the new superintendent of transportation, started with the company many years ago, handling the dispatcher's key at Mackinaw Junction.

F. S. Dewey, vice-president of the Kansas City Power & Light Company, Kansas City, Mo., was elected to serve as president of the Missouri Association of Public Utilities at the annual convention at Springfield, Mo. The convention adjourned on May 6.

Thomas P. Easten was, on April 14, appointed general manager of the Newcastle-on-Tyne Corporation Tramways. Mr. Easten has been with the undertaking since its commencement, and for some time has been assistant general manager. He succeeds Ernest Hatton, the general manager and engineer, who has retired owing to ill health. W. T. Dalton, assistant engineer since the opening of the electric tramways, was appointed engineer at a salary of £800 per annum.

Leslie Spraggon Assistant to President at Buffalo

Leslie Spraggon, superintendent of equipment of the International Railway, Buffalo, N. Y., has been promoted to assistant to the president of the company. Announcement of the appointment was made by B. J. Yungbluth, president of the International, following the resignation of H. L. Mack as vice-president in charge of engineering.

Mr. Spraggon has been with the International system since Dec. 1, 1924. He has been in charge of maintenance of all cars and buses. His early life was spent in Pittsburgh, where he attended the public schools. Mr. Spraggon's first position was as an apprentice in the electrical department of the Carnegie Steel Company of Pittsburgh. He took a night course in electrical engineering in the Westinghouse technical night school and in 1914 went to the Terre Haute, Indianapolis & Eastern Traction Company as assistant master mechanic. There he remained until 1916. Later he was with the Connecticut Company, New Haven, Conn., as assistant supervisor of equpiment.



Leslie Spraggon

He was called back to take charge of that company's equipment after a service of two years with the Boston office of the Westinghouse Electric & Manufacturing Company as sales engineer. From the Connecticut Company Mr. Spraggon went with the International Railway.

During his service as superintendent of equipment of the International Mr. Spraggon was very largely responsible for a 40 per cent reduction in removal of cars from service because of mechanical defects. This improved maintenance, President Yungbluth says, helped the transportation department to achieve a record last year of 90 per cent cars on time at terminal points. He was in charge of the company's safety first work.

Obituary

Benjamin B. Odell, Jr.

Benjamin Barker Odell, Jr., former Governor of New York, and identified with transit developments in Newburgh, N. Y., for many years, died in that city on May 9. Besides his prominent political affiliations, he was at one time president of the Consolidated Gas, Electric Light, Heat & Power Company of Newburgh and of the Central Hudson Steamboat Company.

Mr. Odell at the time of his death was president of the Newburgh Public Service Corporation, formerly the Newburgh City & Suburban Railway. This property has long been owned and controlled by the Odell family.

He and his associates in the management of that company, B. Bryant Odell and H. B. Odell, formerly one of its officers, were among the first to recognize the place of the bus in transportation and to use that vehicle in increasing the effectiveness of the local transportation service to the people of Newburgh and vicinity.

Clarence Thayer Fernaid

Clarence Thayer Fernald, chief engineer of the Boston Elevated Railway, Boston, Mass., died on May 11 in Melrose. It is to be said of Mr. Fernald that he was an integral part of the rapid transit system of Boston. He grew up with it, assisted in its construction and since the death of his predecessor, Chief Engineer George A. Kimball, he has directed the completion of the Elevated system up to its present point. He was intimately connected with the building of every branch of it, the elevated structures and the tunnels and subways, and lately the construction of the extension along the Shawmut branch of the New York, New Haven & Hartford Railroad.

Mr. Fernald became associated with the Boston Elevated Railway in 1900. Prior to that time he had been employed by the Norfolk & Western Railway on preliminary and location surveys and in a general engineering practice in Melrose. Mr. Fernald was born in Charleston, Mass., in 1866. He received a common and high school education and some years later took up scientific studies and advanced mathematics at Massachusetts Institute.

Mr. Fernald had interests beyond his profession. He took part in the affairs of his community, was active in its political interests as a Republican and had connection with several fraternal, social and technical associations.

Frank B. Willis, master mechanic of the Portland Electric Power Company, Portland, Ore., died at his home in that city on April 27. Mr. Willis was a member of the Twenty-Year Club of the company. Working at first as machinist, he was made foreman of the shops in 1912, when all the shops were consolidated. In 1922 he was promoted to assistant mechanic, and just one year ago in April he became master mechanic upon the death of Franklin P. Maize. Mr. Willis was 44 years of age.

Manufactures and the Markets

News of and for Manufacturers—Market and Trade Conditions
A Department Open to Railways and Manufacturers
for Discussion of Manufacturing and Sales Matters

Richmond Will Have Expenditure of $1,000,000

Passage of the new blanket franchise in Richmond, Va., by the City Council will mark the entrance of the Virginia Electric & Power Company on an extensive program of bus and trolley coordination. Approximately $1,000,000 will be spent immediately in the purchase of new buses and street cars and in making extensions and improvements to service. It is expected that this measure will be passed by the Council members without much opposition and that the work of improving the transportation system may be well under way within the next few weeks.

Disposition of the required bus ordinance is expected to be made while the blanket franchise is being subjected to the legal period of advertisement, a step not necessary with the bus paper. The company expended $400,000 in the purchase of the assets of the Richmond Rapid Transit Corporation last September and since that time has added a number of new buses to the system. As soon as the bus ordinance has been adopted approximately 25 new buses will be added to the fleet, at a cost of between $160,000 and $175,000. These new units will be used on extensions of lines planned by the company.

Delivery is being made of the fifteen street cars ordered by the company from the American Car Company, St. Louis, Mo., in December. Specifications on these units appeared in ELECTRIC RAILWAY JOURNAL on March 20, 1926.

Oil-Electric for Chicago

The first oil-electric locomotive for use in the West recently left for Chicago under its own power, for delivery to the Chicago & Northwestern Railway. The locomotive was built by the General Electric, Ingersoll-Rand and American Locomotive companies. It has a capacity of 300 hp. and a weight of 60 tons; running unattached, its operating cost is said to average 1.2 cents per mile. The unit was to run directly from Schenectady to Chicago on its delivery trip.

Executive Changes in Fort Pitt Steel Casting Company

John W. Guay, formerly sales engineer of the Fort Pitt Steel Casting Company, McKeesport, Pa., is now works manager, and H. F. Stratton, formerly in charge of the pattern, mold and core department, is the new superintendent.

Mr. Guay's appointment marks the culmination of eighteen years' diversified experience with the Fort Pitt Steel Casting Company, both in the sales and operating departments. He was for several years in the mechanical department of the Pennsylvania Railroad, prior to his connection with the Fort Pitt Steel Casting Company in 1908.

Mr. Stratton has been general foreman of the pattern, mold and core department of this company. He is a graduate of the mechanical engineering department of Purdue University, and before joining the Fort Pitt Steel Casting Company, in 1920, was for several years connected with the Isaac G. Johnson Company.

Westinghouse Company Announces Promotions

According to an announcement by E. D. Kilburn, vice-president and general sales manager, J. McA. Duncan, for fourteen years Pittsburgh district manager, has been promoted to assistant general sales manager of the Westinghouse Electric & Manufacturing Company. Mr. Duncan has been in the employ of the company for 40 years and has worked in almost every department. This wide experience, coupled with unusual executive ability, eventually led to his recent appointment. W. R. Marshall, formerly branch manager of Buffalo, has been selected to assume the duties of Pittsburgh district manager. These appointments are effective May 1.

In addition to these appointments, H. F. Boe, formerly industrial division manager at Buffalo, has been promoted to branch manager of that office and R. L. Kimber to industrial division manager. W. F. Barnes is appointed branch manager of the Tulsa office of the Westinghouse company.

Four to One Split in G.E. Stock Approved

Stockholders of the General Electric Company at the annual meeting in Schenectady on May 11 approved the plan to change the present authorized common stock of 1,850,000 shares of the par value of $100 each into 7,400,000 shares of common stock without par value. This was in accord with the recommendation of the board of directors the previous month to split the stock on a 4 to 1 basis. Myron F. Westover, secretary of the company, was elected to the board of directors, filling the vacancy caused by the death of E. R. Stettinius, New York. Other directors were re-elected.

When Different Fares Were Rung on the Same Register

The great advance which has taken place in the last 25 years in methods of fare collection and registration is well illustrated in the little pamphlet recently published by the Ohmer Fare Register Company, Dayton, Ohio. It is a reprint of an address delivered by John F. Ohmer before the Pennsylvania Street Railway Association in 1903, and pointed out the objections to the then common practice of having a variety of fares rung up on a single register. As a substitute for this method, Mr. Ohmer outlined the now familiar capa-

ELECTRIC RAILWAY MATERIAL PRICES—May 11, 1926

Metals—New York

Copper, electrolytic, cents per lb.	13.90
Lead, cents per lb.	7.75
Nickel, cents per lb.	35.00
Zinc, cents per lb.	7.12
Tin, Straits, cents per lb.	64.25
Aluminum, 98 to 99 per cent, cents per lb.	27.00
Babbitt metal, warehouse, cents per lb.:	
Commercial grade	56.00
General service	31.50

Bituminous Coal

Smokeless mine run, f.o.b. vessel, Hampton Roads	$4.625
Somerset mine run, Boston	2.00
Pittsburgh mine run, Pittsburgh	1.825
Franklin, Ill., screenings, Chicago	1.925
Central, Ill., screenings, Chicago	1.575
Kansas screenings, Kansas City	2.50

Track Materials—Pittsburgh

Standard steel rails, gross ton	$43.00
Railroad spikes, drive, Pittsburgh base, cents per lb.	2.90
Tie plates (flat type), cents per lb.	2.30
Angle bars, cents per lb.	2.75
Rail bolts and nuts, Pittsburgh base, cents, lb.	4.25
Steel bars, cents per lb.	2.00
Ties, white oak, Chicago, 6 in.x8 in.x8 ft.	$1.35

Hardware—Pittsburgh

Wire nails, base per keg	2.65
Sheet iron (28 gage), cents per lb.	3.15
Sheet iron, galvanized (28 gage), cents per lb.	4.40
Galvanized barbed wire, cents per lb.	3.35
Galvanized wire, ordinary, cents per lb.	2.50

Waste—New York

Waste, wool, cents per lb.	12–18
Waste, cotton (100 lb. bale), cents per lb.:	
White	13–17.50
Colored	10–14

Paints, Putty and Glass—New York

Linseed oil (5 bbl. lots), cents per lb.	11.2
White lead in oil (100 lb. keg), cents per lb.	15.00
Turpentine (bbl. lots), per gal.	$0.92
Car window glass, (single strength), first three brackets, A quality, discount*	84.0%
Car window glass, (single strength), first three brackets, B quality, discount*	86.0%
Car window glass, (double strength) all size, A quality, discount*	85.0%
Putty, 100 lb. tins, cents per lb.	4–6

* Prices f.o.b. works, boxing charges extra.

Wire—New York

Copper wire, cents per lb.	16.00
Rubber-covered wire, No. 14, per 1,000 ft.	$6.25
Weatherproof wire base, cents per lb.	18.00

Paving Materials

Paving stone, granite, 5 in. New York—Grade 1, per thousand	$147
Wood block paving 3½, 16 lb. treatment, N. Y., per sq.yd.	$2.70
Paving brick 3½x8½x4, N. Y., per 1,000 in carload lots	51.00
Paving brick 3x8½x4 N.Y., per 1,000 in carload lots	45.00
Crushed stone, ¾-in., carload lots, N. Y., per cu.yd.	1.85
Cement, Chicago consumers' net prices, without bags	2.10
Gravel, ¾-in., cu.yd., f.o.b. N. Y.	1.75
Sand, cu.yd., f.o.b. N. Y.	1.00

Old Metals—New York and Chicago

Heavy copper, cents per lb.	11.50
Light copper, cents per lb.	9 50
Heavy brass, cents per lb.	7.125
Zinc, old scrap, cents per lb.	4 25
Lead, cents per lb. (heavy)	6.75
Steel car axles, Chicago, net ton	$17.25
Cast iron car wheels, Chicago, gross ton	17.75
Rails (short), Chicago, gross ton	16.75
Rails, (relaying), Chicago, gross ton	25.50
Machine turnings, Chicago, gross ton	7.75

bilities of his recording register and its advantages to conductors, railway and accountants.

In 1903 the ideas outlined in the paper mentioned seemed revolutionary, but the advantages were so evident as to make a strong appeal. Among the companies now using Ohmer fare registers, there are 148 which have employed the register for periods varying from ten to twenty-six years, and most of this number have been users of the register for more than twenty years.

Unfilled Orders for 73 Electric Locomotives

During the month of April twelve electric locomotives were shipped for domestic use and sixteen for foreign use, according to figures compiled by the Department of Commerce. At the end of the month there were unfilled orders for 44 electric locomotives for domestic purchasers and 29 for foreign railways. These figures compare with eleven domestic deliveries and one foreign delivery in March and unfilled orders for 50 domestic and 41 foreign also at the end of March.

Montreal Cars to Have Plymetl Sides and Agasote Headlining

Plymetl, manufactured by the Haskelite Manufacturing Company, will be used for side panels on the 50 new cars being built for the Montreal Tramways, Montreal, Que. The cars are being constructed by the Canadian Car & Foundry Company. Abstracted specifications were published in the issue of this paper for May 8, 1926, page 830, which were in error in giving the material used for headlining. Agasote manufactured by the Pantasote Company, Inc., will be used on these cars.

Tire Man Talks on Balloons for Buses

Balloon tires for buses are coming into popularity fast. This was one of the statements made by William O'Neil, president of the General Tire & Rubber Company, recently, in the course of a summary of the progress of the industry. According to Mr. O'Neil tire engineers have been as active as automobile and bus engineers in bringing every possible comfort and improvement to this fast-growing new mode of transportation.

Interesting as was Mr. O'Neil's summary of the progress of the bus, his remarks about tires deserve particular attention. Among other things he said:

> Pneumatic tires were the first big innovation, but were of doubtful value for a time because the old, cross-woven type of fabric construction was used and fabric tires absolutely refused to stand up. With the appearance of the cord tire the situation improved and cord tires made pneumatics for buses possible. General was among the very first in the field with pneumatic cord tires for the bus, and has followed bus and bus tire development very closely from the beginning.

Mr. O'Neil said that his company's latest contribution to the art is the balloon tire for bus service—strong and sturdy enough to carry the loads and bear the strains, and having large enough air spaces to provide the utmost comfort for passengers and protection for mechanism. Of this particular development he said:

> The greater cushion makes greater speed possible as well and it now seems likely that within a short time most buses will be on balloon tires. Many thousand General balloons are already in bus service and the results are most gratifying to all concerned.

Rolling Stock

Boston Elevated Railway, Boston, Mass., has purchased five 29-passenger city type Mack buses, making 85 units of this type in its large fleet.

Twin City Rapid Transit Company, Minneapolis, Minn., has ordered one Differential electric locomotive crane car from the Differential Steel Car Company of Findlay, Ohio. This car will be equipped with four G.E.-275 motors with type M control, a master controller to be located in the craneman's turret as well as in the front cab of the car.

Track and Line

Chicago, North Shore & Milwaukee Railroad, Highwood, Ill., plans to double track a portion of its line in Milwaukee lying north of Harrison Street.

Wisconsin Power & Light Company, Oshkosh, Wis., will rebuild its interurban track in Plymouth. As soon as this work is completed similar track rebuilding improvements will be carried out on West Irving Street in Oshkosh.

Rockford City Traction Company, Rockford, Ill., has received permission to spend $4,000 to $5,000 for new rails. They will be placed on East and West State Streets, South Main and Seventh Streets.

Springfield Street Railway, Springfield, Mass., through General Manager Herbert M. Flanders, has announced the company's immediate program for the construction and improvement of its trolley track. The initial work along this line calls for an expenditure of $25,000 for relaying the double track on State Street between Pine Point and Bay Road. A section of track in Longmeadow is also to be relaid for a distance of ¾ mile.

Trade Notes

H. N. Goodell has been made district manager of the Western district of the Graybar Electric Company. This appointment was made known coincident with the announcement of transfer of headquarters of the Western district from St. Louis to Kansas City.

Ludlum Steel Company, Watervliet, N. Y., is building a continuous furnace of modern construction and design for billet heating. In the recuperative equipment is employed Ludlum's own heat and scale-resisting material.

Ward B. Maurer has been placed in charge of the new branch office opened by American Hoist & Derrick Company, 1943 Railway Exchange Building, St. Louis, Mo. Mr. Maurer has a wide acquaintanceship with railway men and users of hoisting machinery in general. Before joining the sales force of the American Hoist & Derrick Company several years ago, he was a member of the engineering staff of the Baltimore & Ohio Railroad.

R. L. Cluverius has been appointed Southern department manager of the National Railway Appliance Company, with headquarters in the Munsey Building, Washington, D. C., succeeding H. W. Kidwell, resigned.

Graybar Electric Company announces the appointment of W. B. DeForest as sales manager of its New York offices. Mr. DeForest, previous to his new appointment, was Kansas City branch manager. He brings to his new position the benefit of seventeen years' experience with the Western Electric Company.

Western Electric Company has just opened a new distributing branch house at 50-52 Portland Street, Worcester, Mass. W. A. Searle has been appointed sales manager of this branch, operated by the Boston Supply House as a part of the campaign for better service in the New England territory.

Sullivan Machinery Company, Chicago, Ill., announces that its Knoxville, Tenn., office has just moved from the old location at 614 Market Street to new and larger offices at Room 611-15 General Building, 623 Market Street. E. L. Thomas is manager of the Knoxville branch.

New Advertising Literature

Graybar Electric Company, Inc., New York, N. Y., has issued its 1926 fan catalog, with complete information on all models of fans built by the company.

Quigley Furnace Specialties Company, Inc., New York, N. Y., has issued a booklet entitled "The Quigley Refractory Gun." Information is included therein on the use of this equipment in furnace maintenance, meeting the problem of keeping furnaces at full capacity with minimum shutdowns for repairs. Directions are given for the preparation and use of Hytempite, which is recommended for use as a bond for the ganister.

General Electric Company, Schenectady, N. Y., has issued a 33-page illustrated bulletin, No. GEA-232, entitled "Power Factor and Means for Its Improvement." It is a practical treatise on power factor with the mathematics reduced to simple arithmetic.

Billings & Spencer Company, Hartford, Conn., has issued the 36th edition of its annual catalog of drop-forged tools. It has been the endeavor of the manufacturer to make this catalog a handy guide for all men in wrench-using trades. In addition to the regular Billings numbers, the trade numbers of open-end wrenches are given, and convenient reference may be found in the wrench index table giving dimensions of wrench openings to fit standard nut and bolt sizes. Several new products are listed, such as the chrome-molybdenum tappet and check-nut wrenches and a complete line of chrome - molybdenum "Life - time" wrenches.

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111 W. Washington Street, Chicago, Ill.

THE P. EDWARD WISH SERVICE
50 Church St. NEW YORK
Street Railway Inspection DETECTIVES
131 State St. BOSTON

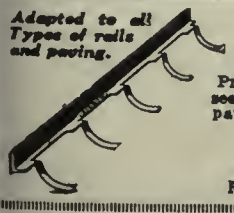
When writing the advertiser for information or prices, a mention of the Electric Railway Journal would be appreciated.

"Axle Specialist Since 1866"
Address all Mail to Post Office Box 515, Richmond, Va.
CAR AXLES
J. R. JOHNSON AND CO., INC.
FORGED STEEL AXLES
For Locomotives, Passenger, Freight and Electric Cars
Smooth Forged or Rough Turned—Carbon or Alloy Steel—Plain or Heat Treated, Forged and Turned Piston Rods, Crank Pins, Large Shafts, Round Bars, etc.


STUCKI SIDE BEARINGS
A. STUCKI CO.
Oliver Bldg.
Pittsburgh, Pa.

ACME Window Curtain Fixtures
Noiseless — direct acting — enlarged friction surface — less parts — stronger — more easily and finely adjusted.
MORTON MANUFACTURING COMPANY
Chicago

UNA
RAIL BONDS-RAIL JOINTS
DYNAMOTORS
WELDING ROD
UNA Welding & Bonding Co.
Cleveland, Ohio.


Adapted to all Types of rails and paving.
GODWIN
Steel Paving Guards
Proved by service to economically prevent seepage and disintegration of street railway paving.
Write for Illustrated Catalog No. 30
W. S. GODWIN CO., Inc.
Race and McComas St., Baltimore, Md.

Concrete is the aristocrat of pavements

News from Los Angeles About Concrete Streets

Los Angeles now has more concrete streets than any other city in the country—a total of over 220 miles. And they are directly linked with several thousand miles of concrete roads in California, thus forming an extension of one of the most famous highway systems in the world.

Motor traffic from every section of the state flows along these sturdy streets all day and far into the night. This includes countless automobiles, huge trucks loaded to capacity, and busses built like Pullmans.

Only streets paved as the knowledge and experience of the modern highway builder directs could long withstand this punishment. The concrete streets of Los Angeles are doing so year after year.

They are also meeting the stern demand of skid-free safety—even on the steepest grades.

And concrete is the preferred pavement in the residential sections, as well as in the industrial. For its attractive, light gray color makes it the finest looking pavement money can buy, it is always clean and neat, and it always has a true, even surface.

These are some of the reasons why Los Angeles and hundreds of other alert cities are laying concrete streets, and will lay more.

All of the facts are in our free booklet on "Concrete Streets." Ask for your copy.

PORTLAND CEMENT ASSOCIATION
A National Organization to Improve and Extend the Uses of Concrete

Atlanta	Detroit	Nashville	Richmond, Va.
Birmingham	Indianapolis	New Orleans	Salt Lake City
Boston	Jacksonville	New York	San Francisco
Chicago	Kansas City	Oklahoma City	Seattle
Columbus	Lincoln, Nebr.	Parkersburg	St. Louis
Dallas	Los Angeles	Philadelphia	Vancouver, B. C.
Denver	Milwaukee	Pittsburgh	Washington, D. C.
Des Moines	Minneapolis	Portland, Oreg.	



"For Maximum Profits"—

The confusion of conflicting claims made by competing motor coach manufacturers leaves you but two alternatives in answering the question—"which motor coach will be most profitable for me to operate?"

You must either depend upon your own judgment in weighing the over-enthusiastic assertions and volumes of evidence of the various salesmen, or you must lean on the opinion of some other person or organization in whose judgment you have confidence and who has had the opportunity to run down all of the facts.

Who will you trust to build the motor coaches on which part or all of your future prosperity depends?

The American Car and Foundry Company provided the answer to this perplexing question, after an investigation that was complete in both scope and thoroughness, covering all of the available makes of motor coach.

The Fageol Safety Coach, with the Hall-Scott engine, was placed at the head of the list after two years of thorough and painstaking research of all the operating facts and the engineering features which produced those operating results, and on this investigation it was chosen to be the automotive passenger unit of the American Car and Foundry Company.

May we tell you why the Fageol Safety Coach is achieving unequalled operating results?

FAGEOL
SAFETY COACH

Territory East of the Rocky Mountains served by
AMERICAN CAR AND FOUNDRY MOTORS CO.
The Fageol Division
30 Church Street, New York, N. Y.

Territory West of the Rocky Mountains served by
FAGEOL MOTORS COMPANY
Hollywood Blvd. at 107th Avenue
Oakland, Calif.



Mixing Fresh Paint with Fresh Print

From every side, these days, we hear that freshly painted cars make better advertisements for the road. New paint attracts new passengers. New seats attract new occupants. New straps encourage new standees and new cars are called for to transport new carloads in competition with new transportation agencies.

No wonder, therefore, that equipment manufacturers so urgently advise the purchase of modern equipment. But are they, to a man, taking their own medicine? Are all equipment manufacturers *advertising* modernized equipment in a thoroughly modern way?

The answer to this question is, of course, that "some do and some do not." Some paint their messages in words and pictures as fresh and attractive as the products they advertise. Others fall into an advertising rut and—even when they have new products to promote—their presentation of the matter is sometimes as dingy and as unappealing as the time-and-travel worn equipment they so heartily condemn.

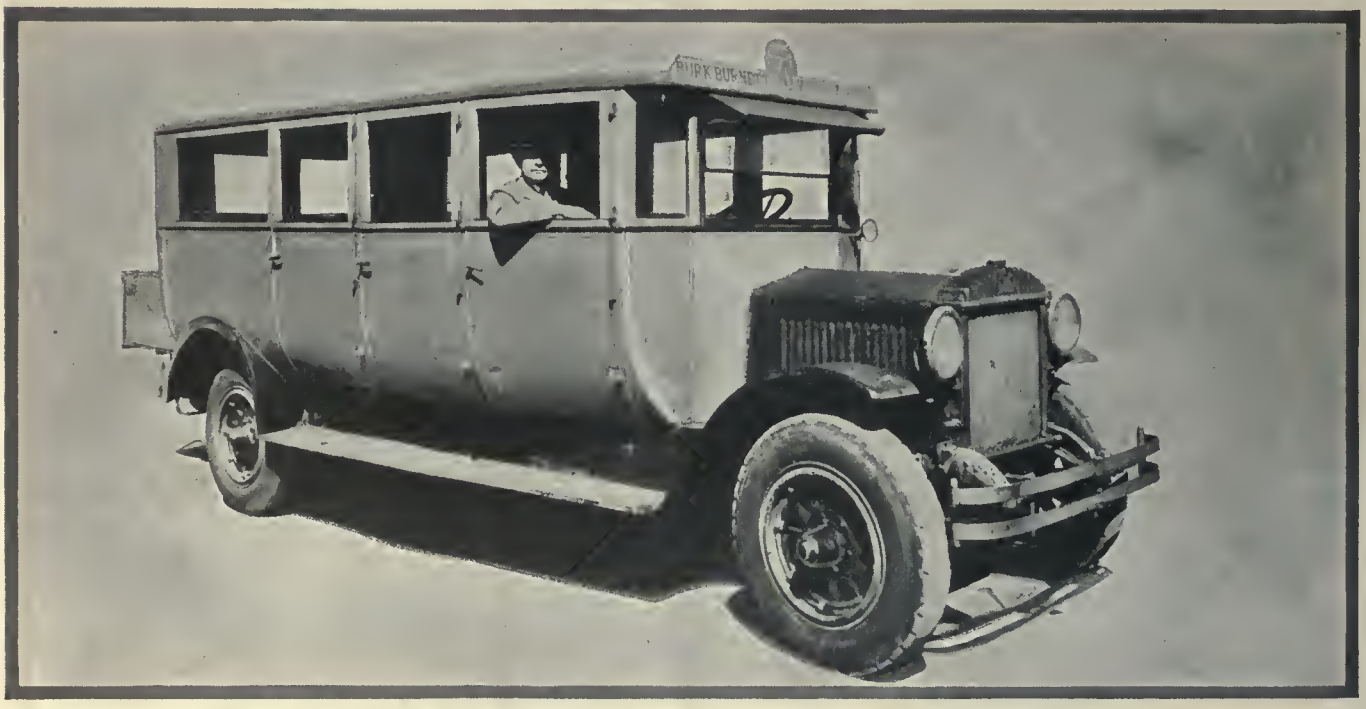
Since operators find that freshly painted cars appeal to passengers who hesitate to ride, is it not logical that *freshly worded advertisements* would appeal, in turn, to the operators who may hesitate to buy?

Our business is to produce modern transportation advertising. When we recommend "fresh paint" for car equipment, therefore, we try to say it with "fresh print," hoping that an ever-growing number will enjoy the reading of our advertisements, that it will thus become ever more profitable for railway and equipment advertisers to employ our services and that our "operating revenue" will thereby be rapidly increased.



Doyle, Kitchen & McCormick, Inc.
2 WEST 45th STREET, NEW YORK
An Advertising Agency





Generals still going strong after 58,880 miles on this bus

With only two punctures!

Talk about endurance!

The bus pictured here is one of the two put in service by the Wichita-Burkburnett Stage Company on the 16-mile run from Wichita Falls to Burkburnett on July 7, 1925.

Its daily schedule calls for sixteen trips between these two Texas points every day—the first at 7 a. m., and one every hour thereafter until 11 o'clock at night.

When this photo was taken, on February 25, 1926, these Generals had already completed 3,680 of these 16-mile trips.

In 230 days, they had traveled a total of 58,880 miles—with only two punctures! They had been in constant service from the time they went on the wheels until this photo was taken—with the exception of four days while minor adjustments were being made on this bus.

Can you imagine a more grueling test for any tire?

And yet such records for Generals are not surprising. You hear similar stories from large fleet operators wherever you go. You hear astonishing reports of amazing economies in gasoline and power consumption, thanks to General's lower rolling-resistance. You hear of side-by-side tests which prove that Generals not only "go a long way to make friends," but a much longer way to keep them.

Which explains why fleet operators everywhere are now standardizing on the *General Tire.*

The Mark of Leading Tire Stores Everywhere

The

GENERAL

TIRE

—goes a long way to make friends

BUILT IN AKRON, OHIO, BY THE GENERAL TIRE AND RUBBER CO.



Double deck bus by The Six Wheel Co., using Edwards Metal Sash

Saves Its Own Cost Many Times Over

Edwards Metal Sash costs you very little more per bus than ordinary, rattling, air-leaking, costly-to-maintain wood sash.

It's worth that extra cost in appearance and in passenger convenience!

And yet Edwards Metal Sash pays for itself a great many times, by its saving of maintenance costs.

There's nothing about Edwards Metal Sash to wear out—nothing to get out of order.

It withstands the ravages of weather. It repels the onslaughts of time. Passengers can use it, easily, but they can't hurt it!

Because it requires practically no upkeep, because it attracts and pleases passengers, Edwards Metal Sash is a money saver, a money maker for every bus operator.

Already adopted by many body builders, it can be installed on your specification by any builder. Write us for our profusely illustrated booklet which goes into details. No expense—and no obligation.

Edwards Screen Sash in summer, and Edwards Storm Sash in winter, can be installed on any bus.

O. M. EDWARDS CO.
Syracuse, N. Y.

Canadian Representatives: LYMAN TUBE AND SUPPLY CO., Montreal and Toronto

TRADE PAOWNYC MARK
EDWARDS

These Builders Use Edwards Metal Sash:

Beerwort & Co.
Boston Body Co.
Braun Specialty Co.
Broens-Weller Body Co.
J. G. Brill Co.
Burstein Body Works
Carolina Body Co.
Eckland Bros.
Fageol Co.
Graham Bros.
International Motors Co.
Paterson Vehicle Co.
The Six Wheel Co.
E. J. Thompson Co.
Yellow Truck & Coach Mfg. Co.

—and many others.

Edwards Metal Sash

SUPERIOR LACQUERS FOR FIFTY YEARS



To keep both cars AND buses PROFITABLY new ——

EGYPTIAN LACQUERS

The Quicker — Better-looking — Longer-lasting Finish System

"In creating favorable public sentiment and in attracting riders to its vehicles, there is nothing which will bring greater returns than a liberal use of paint."

This from an editorial in the Maintenance Issue of ELECTRIC RAILWAY JOURNAL. And it is representative of a trend of thought throughout the industry today.

Furthermore, with the development of Egyptian Lacquers suitable for use on electric railway cars and buses, it becomes economically practicable even on the most restricted budget.

Where formerly it required anywhere from seven to fourteen days for a good paint job, it takes but a fraction of this time to make a longer-lasting, and better-looking Egyptian Lacquer job. Cost of labor, materials and car "shopping" time are reduced to an absolute minimum. Yet the average modern electric railway paint shop needs little, if any, additional equipment, to carry out the Egyptian Lacquer system. Successive coats are easily applied with a standard spray gun at hourly intervals.

Consult us before putting your next finishing or refinishing job in hand. Let us demonstrate to your own satisfaction. Bulletins and full information gladly sent on request.

THE EGYPTIAN LACQUER MFG. CO.

90 West Street, New York



The copper arteries of industry

COUNTLESS miles of industry's "Copper Arteries" are Rome Made power cables—selected for this exacting service by experienced transmission engineers who will approve only dependable, honestly engineered products.

Likewise countless installations of Rome Made insulated wires and cables are servicing industry's needs in thousands of great American industrial plants—selected by plant engineers and electricians who can run no risk of costly shutdowns through wire and cable failures.

Back of the wide variety of Rome Bare and Insulated Wires, lies the reputation of 20 years' successful performance—for all Rome Wires are manufactured from copper wire bar to finished copper wire, in Rome Mills covering 20 acres of manufacturing floor space.

Rome Service—ample stocks and competitive prices, are at your disposal—while an opportunity to quote on any of your wire requirements will always be welcome.

Stranded Double Braid Rubber Covered Wire

ROME WIRE COMPANY, ROME, N.Y.

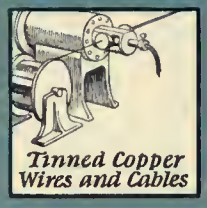
ROME WIRE

FROM WIRE BAR TO FINISHED COPPER WIRE

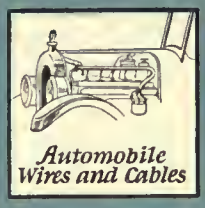




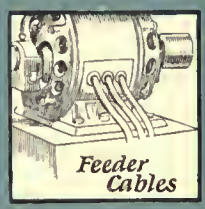


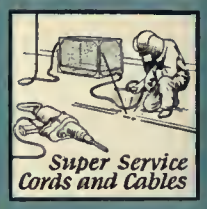




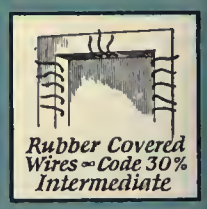




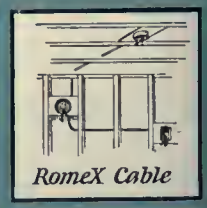






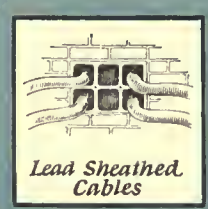




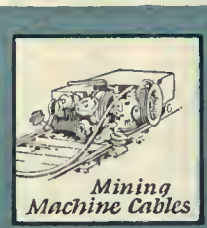


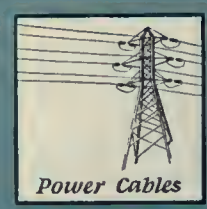














PURE rubber alone does not make the best insulation for electrical conductors. But pure rubber correctly compounded with the right ingredients will give the finest of insulations, combined with remarkable aging qualities.

Years of investigation and analysis are behind the insulation compounds used with Rome rubber covered wires—and, as a result of this careful study, these wires stand today as quality products.

Every Rome wire is built—from wire bar to finished copper wire—in Rome Mills, under careful supervision, and must live up to the Rome reputation.

If you will let us know in what wires and cables you are interested, we will be glad to send you samples, catalogs, and other information that will be of help to you.

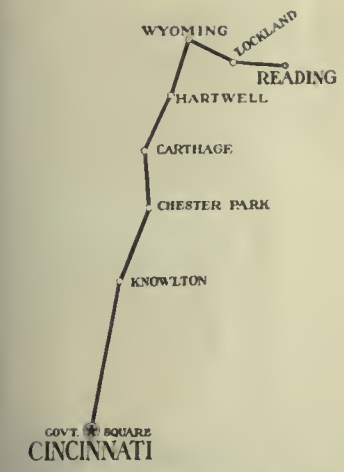


ROME WIRE COMPANY

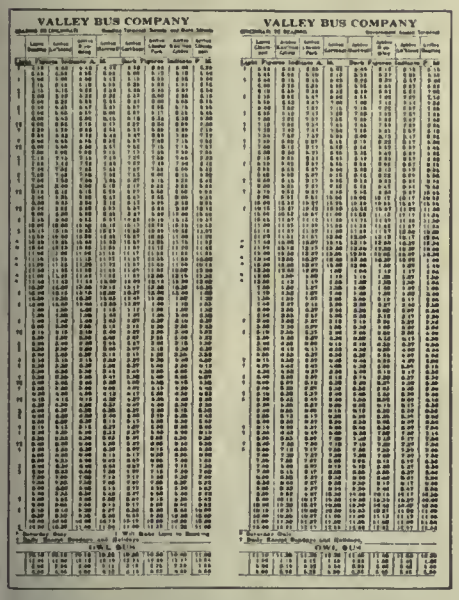
Mills and Executive Offices: ROME, N.Y.

Diamond Branch: Buffalo, N.Y.

New York—50 Church Street
Boston—Little Building
Chicago—14 E. Jackson Blvd.
Detroit—25 Parsons Street
Cleveland—1200 W. 9th Street
Los Angeles—J. G. Pomeroy, Inc., 336 Azusa Street
San Francisco—J. G. Pomeroy, Inc., 51 Federal Street



The "tracks" of the Garford Greyhound are only governed or limited by "rights-of-way" to the extent of satisfactorily serving public convenience. *Wherever* the public desires overland travel—on short or long trips—



—*whenever* they desire to go—their convenience can be served with Garford Greyhound Service.



Interesting data on the Greyhound Buses is available for the asking—no obligation in making request.

GARFORD GREYHOUND BUSES

Symbolized—

are the Motor Buses that carry the name of The Garford Greyhound.

Developed for speed and dependability in flexible bus operations, Greyhound Buses are built, figuratively, of spring steel and whipcord, making for great strength to withstand daily service on City Streets or on the Open Road. A low center of gravity in the well balanced chassis, with mobility derived from a powerful, but economical, 6-cylinder engine, makes for supreme grace and ease of motion.

The very appearance of the Greyhound Motor Buses invites patronage. Quality bodies (built by Garford) fine of line, light in weight, harmonious in color combinations, present an example of beauty found in few motor buses. Excellent riding comfort obtained from loungy seats and ample leg room creates the good will of passengers and satisfies their demand for restful travel.

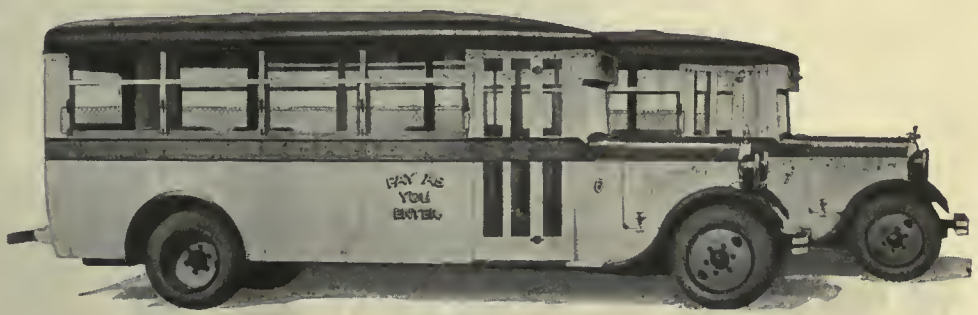
Such features symbolize and make possible for Bus Operators to convert a generous portion of gross receipts into net revenue and net profit.

Garford Greyhounds have set a higher standard for revenue producing.

GARFORD PIONEERED 4-WHEEL BRAKES ON MOTOR BUSES

The Garford Motor Truck Company

631 Wapak Road, Lima, Ohio



Two Garford Greyhound 21 PAYE's on the "tracks" illustrated above.



Interior and exterior views of Goodyear-equipped White motorbus of the new type specially designed for balloon tires and destined for service under Fred Harvey management over the Indian Detour

GOODYEAR

Copyright 1926, by The Goodyear Tire & Rubber Co., Inc.

Over the Indian Detour on Goodyear Cord Bus Tires

Seventeen new de luxe motorbuses are on their way from the White Motor Company's factory to the Santa Fe Transportation Company, for use on the "Indian Detour" between Las Vegas and Albuquerque, New Mexico.

These buses are specially designed, with low lines and extra comfortable riding qualities.

The tourist stepping from his train at Las Vegas or Albuquerque for the "Indian Detour" ride, will embark on a land cruise of 240 miles through earliest historic America, and one of the most enchanting scenic regions in the world.

The route lies in part along the old Santa Fe trail, of the pack train and covered wagon, pony express riders and Indian fighters of the first overland mail and the swaying Concord coaches that in the early sixties ran from Independence, Mo., to Santa Fe in two hazardous weeks and at a fare of $250 the passenger.

The Fred Harvey management of the Santa Fe Transportation Company knows from experience the kind of reliable, durable and low-cost service given by Goodyear Pneumatic Bus Tires, because the entire sightseeing fleet at Grand Canyon National Park is equipped exclusively with Goodyear Cords

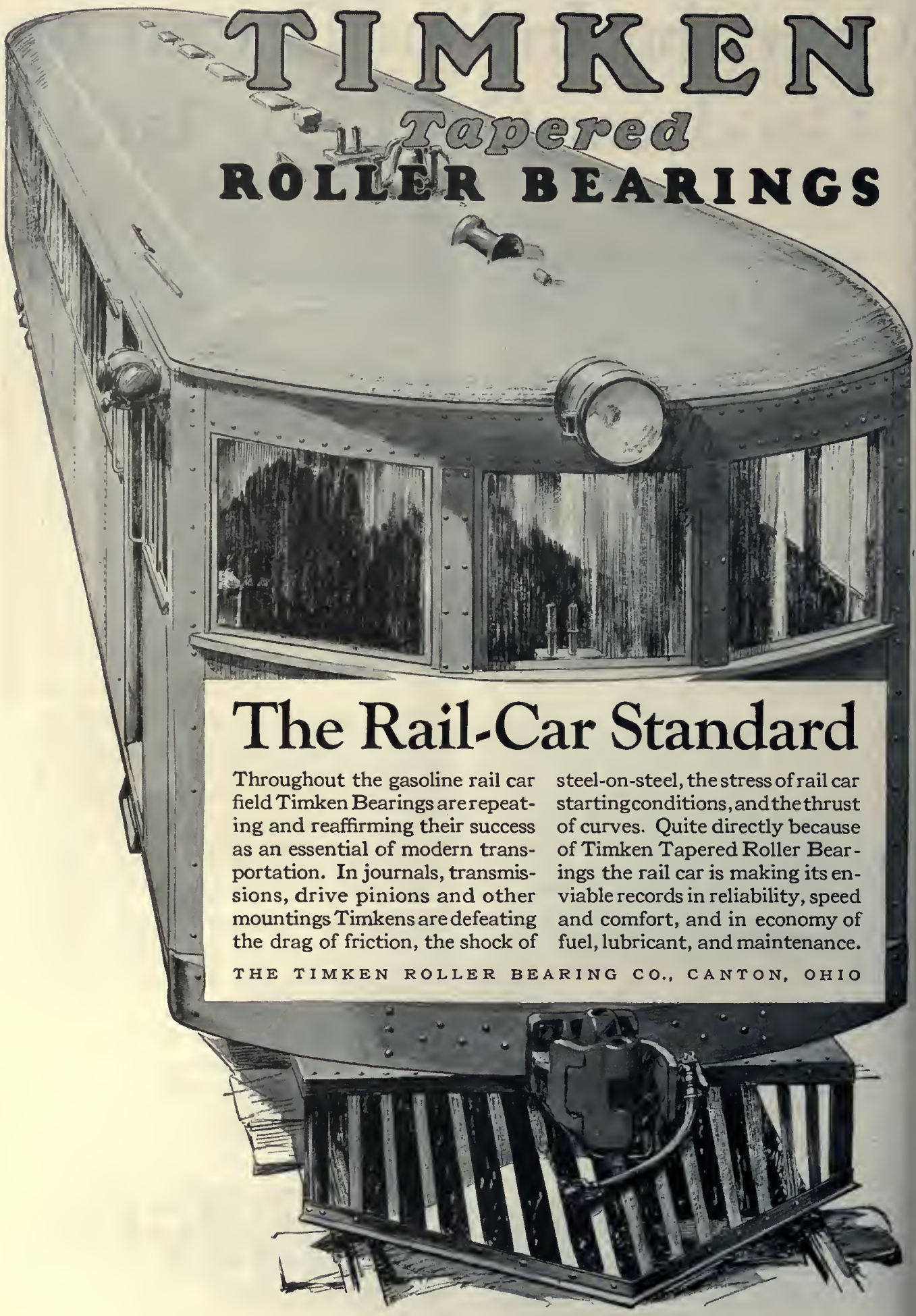
What a contrast the new service will offer to that old style of travel is amply pictured in the luxury of the new motor coaches, the swift, even speed at which they will traverse the canyons and scale the ridges, and the dependable, secure and cushioning qualities of their Goodyear Pneumatic Tires.

Goodyear Pneumatic Bus Tires are made with SUPERTWIST —the extra elastic, extra durable cord fabric developed by Goodyear for Goodyear Tires alone. Goodyear Bus Tires are better because of SUPERTWIST, yet they cost you no more

BUS TIRES

Made with SUPERTWIST

TIMKEN
Tapered
ROLLER BEARINGS



The Rail-Car Standard

Throughout the gasoline rail car field Timken Bearings are repeating and reaffirming their success as an essential of modern transportation. In journals, transmissions, drive pinions and other mountings Timkens are defeating the drag of friction, the shock of steel-on-steel, the stress of rail car starting conditions, and the thrust of curves. Quite directly because of Timken Tapered Roller Bearings the rail car is making its enviable records in reliability, speed and comfort, and in economy of fuel, lubricant, and maintenance.

THE TIMKEN ROLLER BEARING CO., CANTON, OHIO



Modern Cars

Essential to Progress

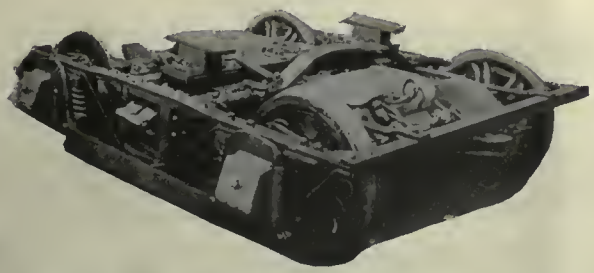
Today's conditions require better equipment — light weight, better operating characteristics, and more attractive appearance—in other words *modern cars.*

Let our engineers help you develop equipment for your modernization program.

We will gladly offer designs and estimates, or quote on your plans and specifications.



For feeders and co-ordinated service, the Cummings Gas-Electric Motor Coach offers the most modern form of automotive vehicle.



Type MC-62 Light Weight Low Car Body Truck for City and Interurban Service

CUMMINGS CAR AND COACH CO.

Successors to McGuire-Cummings

111 W. Monroe St., Chicago, Ill.

Outsell the auto salesman



The man who waits and waits on the street corner, while the comfortable autos speed by, is easy prey for the automobile salesman. Every progressive man instinctively wants to own "a car." How badly he wants it and how much he'll use it, depends to some extent on the convenience and attractiveness of his local transportation facilities. Often an exasperating wait only to board an uncomfortable and out-of-date trolley car, has proved subconsciously a good sales argument for many a local automobile dealer.

can be done with modern cars

After all the auto salesman and the electric railway company have one and the same basic commodity to sell—transportation. The public wants transportation, but it demands the modern kind.

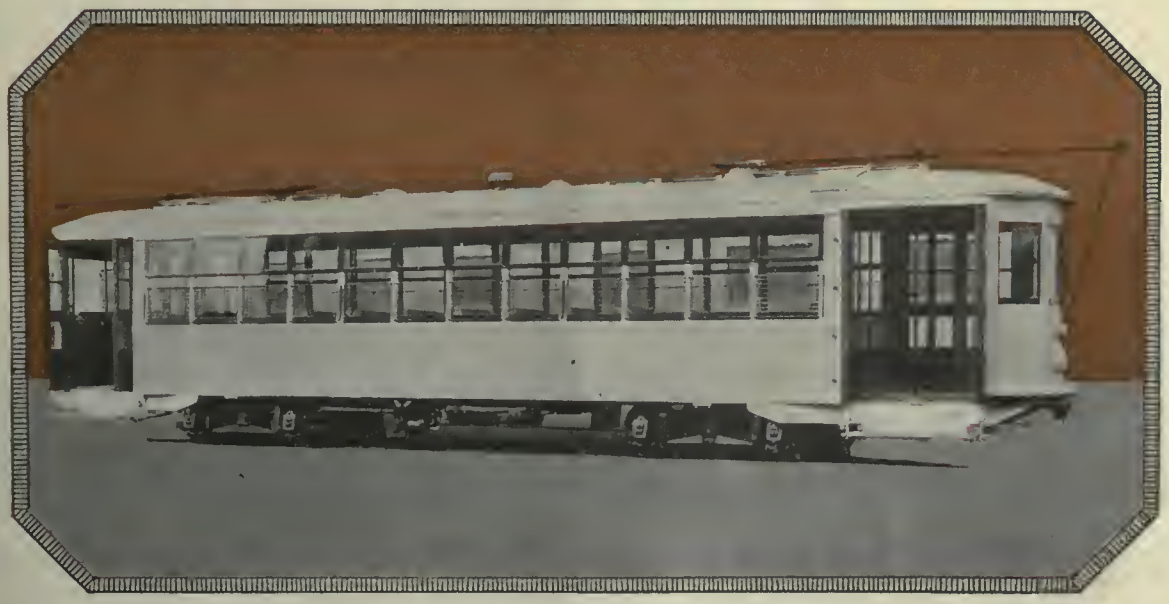
People buy and ride automobiles chiefly for comfort and convenience. Give them equivalent comfort, reasonable convenience and frequent service with the street cars and they may not be so anxious to pay a luxury price for their everyday riding.

Cost is a consideration, but not a controlling one. You may prove to the average man that it costs him over ten cents a mile to operate his automobile. You may show him the obvious economy of a ride on the street car. But his viewpoint is apt to be one of "hang the expense," where his own time or his comfort are concerned. In other words, you've got to sell him something more than a cheap ride.

Putting the obsolete trolley against the present-day automobile is like trying to sell ocean transportation on sailing ships. It isn't being done. But just as the steamship companies are gaining more and more patrons by popular-priced tours on modern efficient ships, so also the progressive railway companies are gaining riders with a modern-car type of service.

Beat the automobile salesman to it—and sell the public what it wants.

THE J. G. BRILL COMPANY
PHILADELPHIA, PA.
AMERICAN CAR CO. ST. LOUIS MO. — G.C. KUHLMAN CAR CO. CLEVELAND, OHIO. — WASON MANF'G CO. SPRINGFIELD, MASS.





WHEEL WEAR

How much is caused by brake shoes?



The circumference of a wheel is at least seven and a half times as long as the brake shoe. Therefore, during brake application, any spot upon the wheel is cooling in the air at least seven and a half times as long as it is heating under the brake shoe. The whole surface of the shoe, however, is in constant contact with the wheel so that it becomes much hotter than the wheel and often becomes incandescent at the surface.



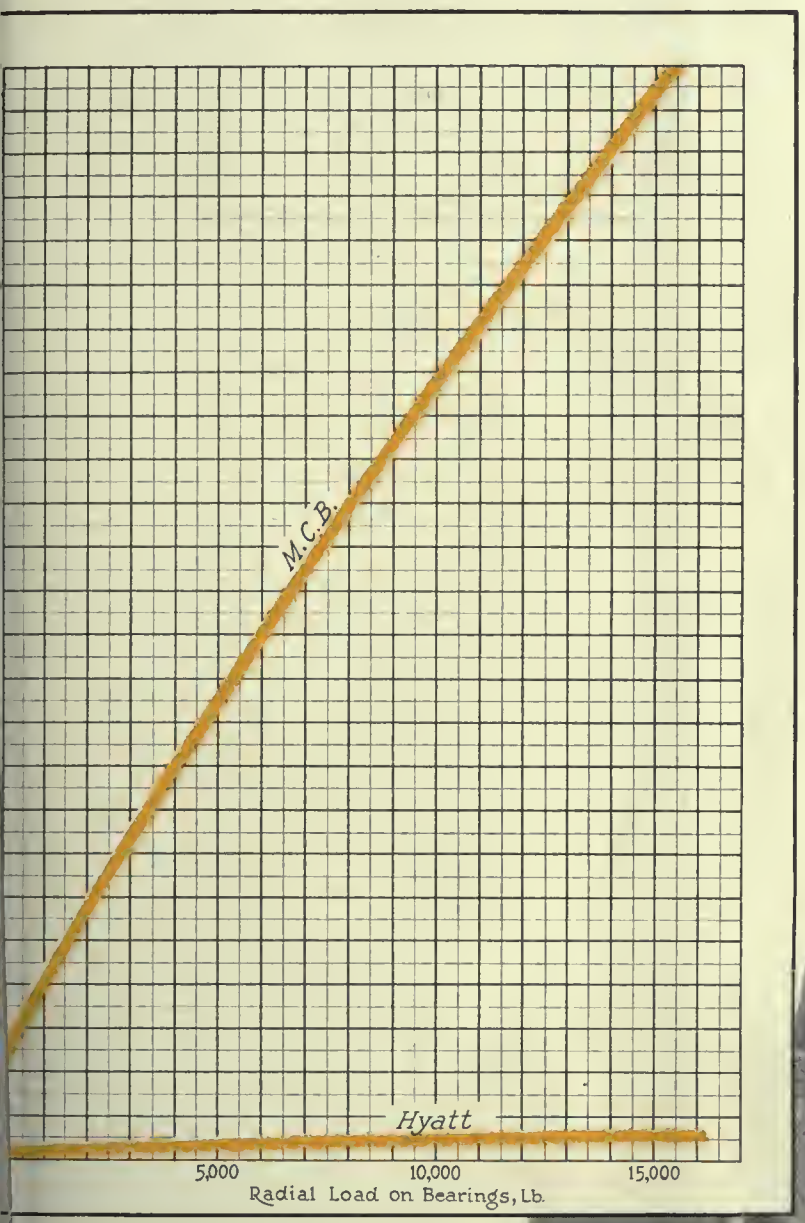
There is, therefore, no wear such as occurs between wheel and rail where both surfaces remain cool even though they roll together at greater pressure than wheel and shoe. After years of research work on our Brake Shoe Testing Machine, where rail wear is eliminated, *the wheels show no measurable wear from brake shoes.*

THE AMERICAN BRAKE SHOE AND FOUNDRY COMPANY

30 CHURCH ST., NEW YORK
332 SO. MICH. AVE., CHICAGO



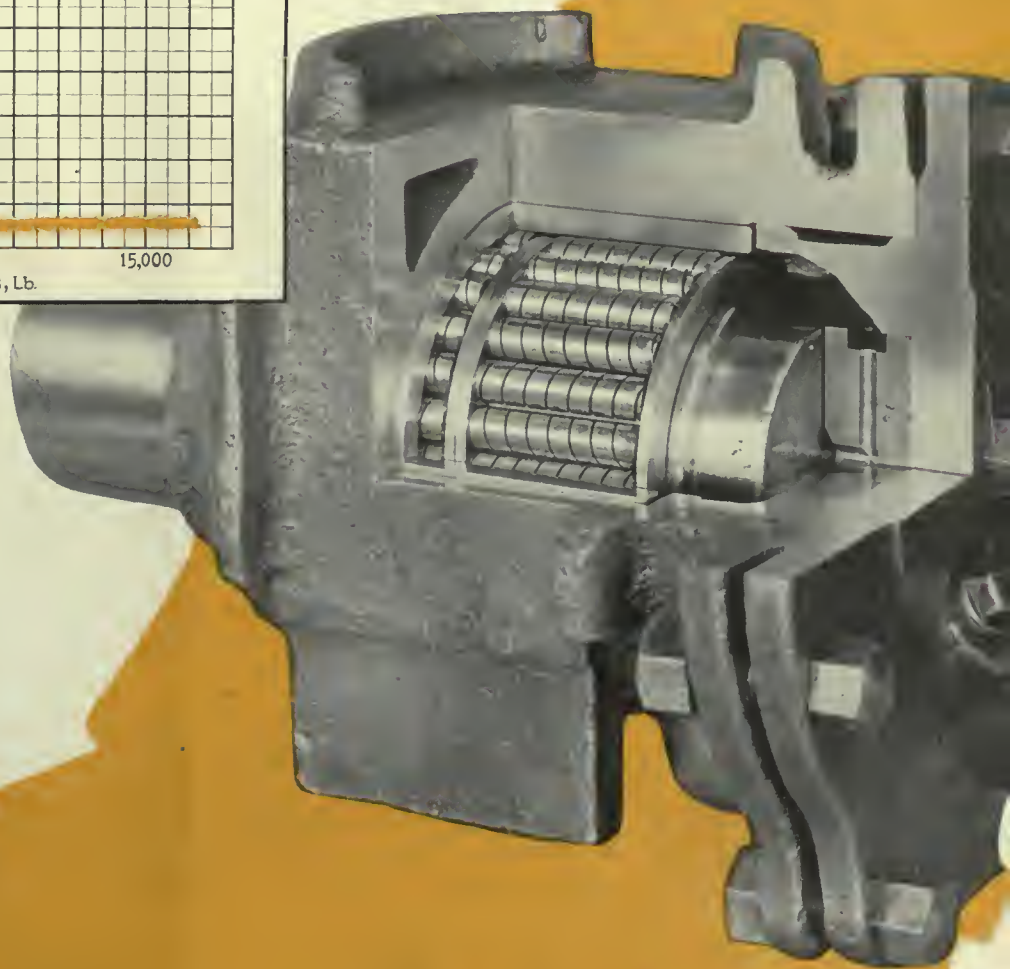
The PROOF of Easy Starts



Comparative laboratory tests between Hyatt Roller Bearings and standard bronze bearings, recorded herewith, show plainly the reason for the smooth easy starts so characteristic of Hyatt equipped cars.

One conclusion clearly demonstrated is that starting torque of Hyatt Bearings is only 2.2% to 8.7% that of bronze, depending upon the load.

Typical railway journal boxes were tested—one equipped with a Hyatt Roller Bearing—the other with a standard bronze. Loads up to the maximum axle rating and speeds up to 600 R.P.M. were used.



Hyatt rolling motion promotes smooth starting, faster acceleration and economy of operation. It cuts power consumption, lubrication and maintenance expense.

Proved by more than a million car miles, the record of Hyatt Roller Bearings in railway service is an open book. Write for information.

HYATT
Quiet
ROLLER BEARINGS

Proved by more than a million car miles

Meeting Every Requiremen of Modern Railway Service

Railway cars that operate for months at a time without attention of any kind to journal bearings are economical.

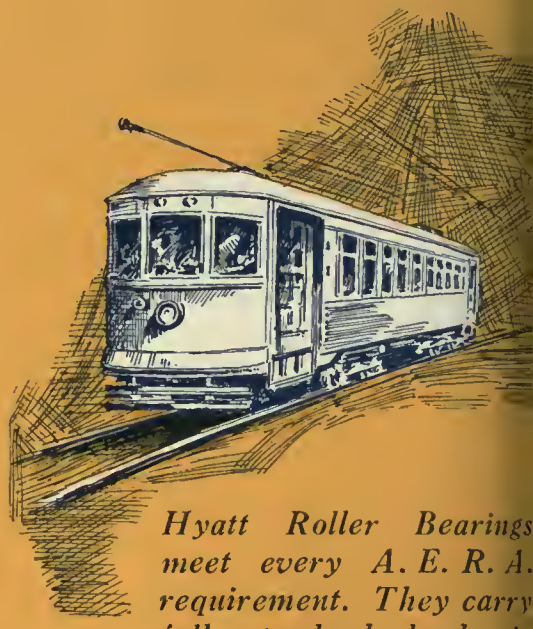
When they attract patrons because of their smooth, silent riding qualities, and can be kept on time in fast, hard schedules—they are profitable investments.

"We cannot give you figures for maintenance expense during the nearly two years our Hyatt equipment has been in service," reported the Master Mechanic of a Mid-western railway, "because we have not spent one cent for that purpose." And this car has nearly 150,000 miles of service to its credit.

Another mechanical man said that his Hyatt equipped car was the only one that ever made scheduled time on a daily round trip of over 100 miles on a difficult division.

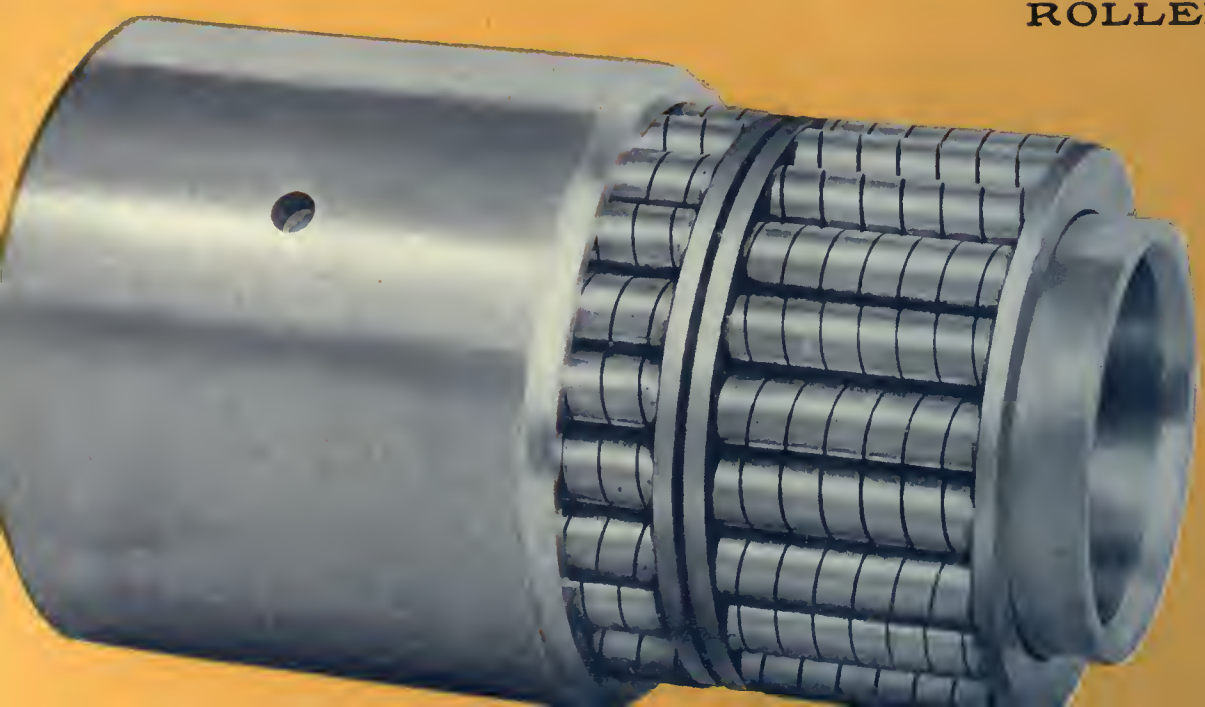
Hyatt Roller Bearings are meeting every requirement of modern railway service, as proved in more than a million car miles.

HYATT ROLLER BEARING CO., NEWARK, N. J.
(Division of General Motors Corporation)



Hyatt Roller Bearings meet every A. E. R. A. requirement. They carry full standard loads in boxes which fit all standard trucks without change.

HYATT
Quiet
ROLLER BEARINGS



Hyatt Railway Bearing

"Standard"



On the Northern Ohio Traction & Light Co.

The "Cleveland Limited" illustrated above is equipped with "STANDARD" Rolled Steel Wheels.

Rolled Steel Wheels
Quenched and Tempered Carbon Steel Axles
Coil and Elliptic Springs

STANDARD STEEL WORKS COMPANY

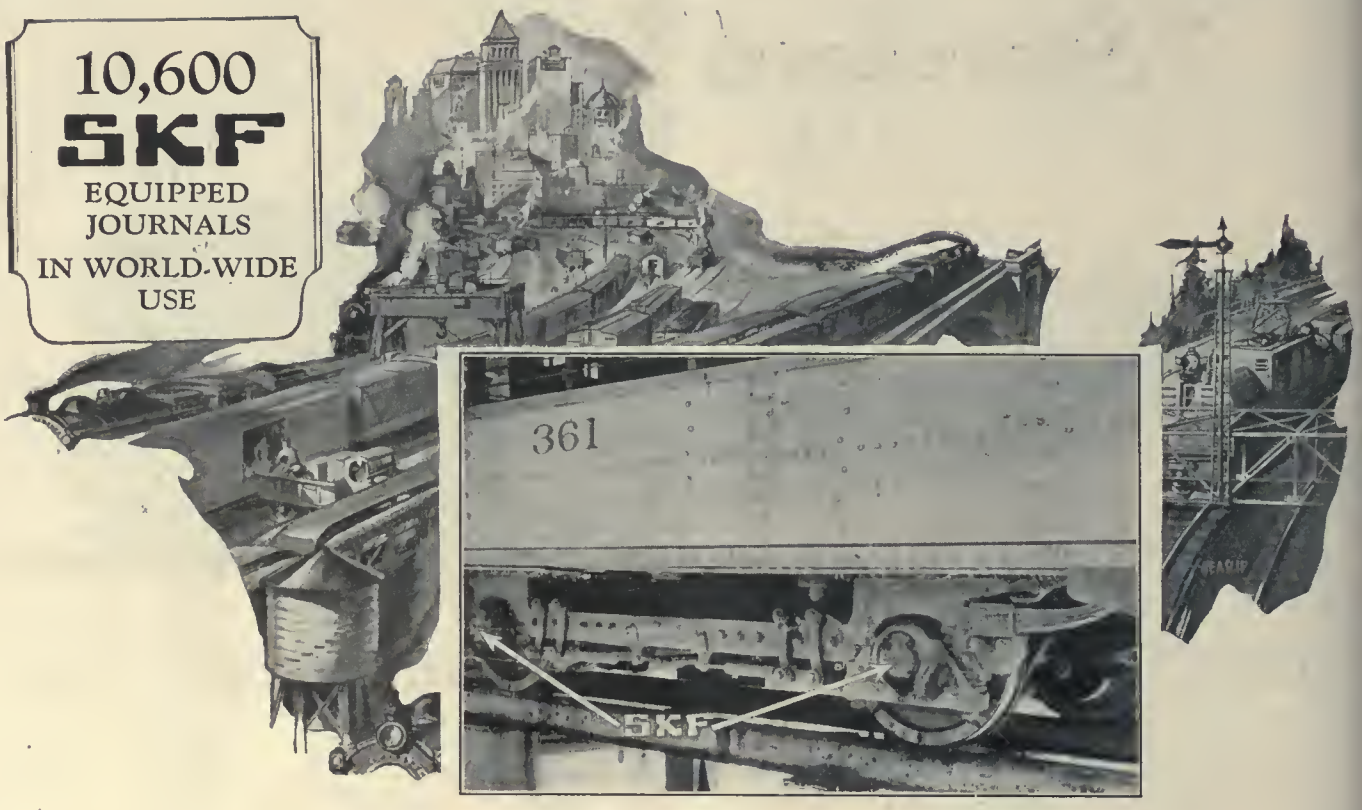
PHILADELPHIA, PA.

BRANCH OFFICES:

CHICAGO	PORTLAND, ORE.	ST. PAUL, MINN.
ST. LOUIS	RICHMOND, VA.	PITTSBURGH, PA.
NEW YORK	SAN FRANCISCO	LOS ANGELES, CAL.
HOUSTON, TEXAS	BOSTON	MEXICO CITY, MEX.

WORKS: BURNHAM, PA.

10,600
SKF
EQUIPPED
JOURNALS
IN WORLD-WIDE
USE



Skayef Journals Make Easy Riding and Insure Operating Economies Too!

Send for
SPECIAL
RAILWAY
BULLETIN
and
Surveys of
Miscellaneous
Industries

THE economic importance of Skayef Self-Aligning Roller Bearings for car journals is an established fact. Ruggedness and low maintenance are two outstanding factors which make this type of bearing particularly adaptable in the present era of more efficient operation.

Skayef Self-Aligning Roller Bearings, smooth and easy running, make a marked difference in the riding qualities of cars, even where rough and uneven track is encountered. Their long life eliminates frequent layups for bearing repairs or adjustments. Housings are designed to exclude dust and retain lubricant without renewal for months.

SKF INDUSTRIES, INCORPORATED
165 Broadway, New York City

1578



Better finish in less time!

How often do you refinish your Cars?



MAINTENANCE men who know Valentine's Railway Finishes will not be surprised to learn that the car pictured above required "only touching up in spots" after more than three years of service! *

Small wonder that J. D. Barnhart, Superintendent of Shops of the Illinois Traction System—which operates the car in question—says of Valentine's Railway Finishes: "We have found your material to hold up remarkably well."

Scores of other railway men can recite similar experiences. They know that it pays to employ materials with a reputation for unequaled durability. Only by so doing can the expense and delay involved in refinishing be minimized. And of course that means: use Valentine's Railway Finishes!

* *The car referred to was finished with Valentine's Railway Finishes in October, 1922. "In February, 1926," says Mr. Barnhart, "it was touched up in spots only!"*

VALENTINE'S FINISHES

VALENTINE & COMPANY

Manufacturers of

Nitro-Valspar—Valentine's Varnishes—Valspar-Enamels

New York Chicago Boston Detroit

W. P. Fuller & Company Pacific Coast



When you modernize be sure to Miller-ize

To consider these five points of superiority is to realize how well Miller Trolley Shoes fit into the industry's modernization movement.

1. Less wire wear. Full 3-inch sliding contact surface "hugs" the wire closer than any wheel—so that less trolley tension is required for absolutely safe operation.

2. Less shoe wear. Sliding contact of shoe lasts longer than wheel because there are no bearings to wear out and only a few moving parts.

3. No lubrication. The absence of rotating parts eliminates the time and labor required to oil the bearing of the trolley wheel.

4. No arcing. Constant contact prevents the pits and burns that are found in the ordinary trolley and contact device.

5. Ample current capacity. Sliding contact handles heavier current drafts than trolley wheels—and always insures steady power for motors and lights.

To provide you with further proof of Miller Trolley Shoe ability, we will gladly co-operate for a trial under your own conditions.

Miller Trolley Shoe Company

295 Columbia Road, Boston 21, Mass.

M

TROLLEY SHOES

Sectional View showing machine shop of the Third Avenue Railway System, 65th Street and Third Avenue, New York City. All the machinery in this shop is lubricated with

TEXACO LUBRICANTS



TEXACO

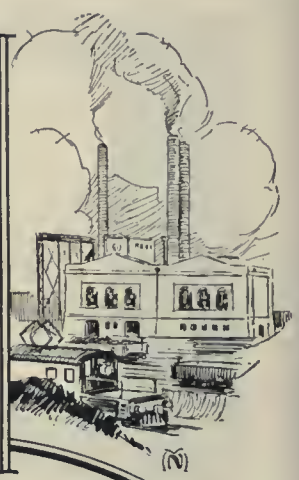
The Chosen Lubricant of ELECTRIC RAILWAYS

The Texas Company, U. S. A., 17 Battery Place, New York City

OFFICES IN PRINCIPAL CITIES



Correct Lubrication is Economy



REPLACEMENT and repair expense are among the heavy items in the cost of running any industrial plant. Nothing, of course, can prevent machinery from wearing out eventually. But if the life of an expensive machine can be lengthened by a year, or even by a few months, it means a great saving.

Correct lubrication will lengthen the life of any piece of machinery. But correct lubrication means more than merely filling the oil cups at regular intervals and making sure that the oil reaches the bearings.

The grade of the oil, and its quality, are just as important factors as the quantity.

Because of the several demands made upon it, the oil or grease must be of a quality to stand up under the bearing pressures, running speed and degree of heat to which it is subjected.

When high quality lubricants are used, in the grades suited to the requirements of the bearings, they will reduce depreciation cost and repair expense.

Standard Oils and Greases

are lubricants of the highest quality, and are made in many grades to suit exactly the requirements of all machinery used in the industrial world.

The lubrication engineers of the Standard Oil Company (Indiana) make surveys of industrial plants, without charge, and recommend the correct grades of lubricants for each piece of machinery.

STANDARD OIL COMPANY
(INDIANA)

***General Offices:* 910 S. Michigan Ave., Chicago, Ill.**



Newport News still a satisfied user of "Tool Steel" gears + pinions!

1908

OPS—THE UNSAFE AND NEGLIGENT WAY OF SUSPENDING FIRE PAILS

schedule could be maintained even if the maximum speed was cut to 28 m.p.h. The standard ratio is now 17:67. The saving in energy consumption has not been calculated, but there has been a very perceptible decrease in the number of baked armatures and fields. The company has also changed from bolted gears to the Cincinnati Tool Steel Gear & Pinion Company's solid gear.

MAINTENANCE RECORDS

Until the property was taken over in January, 1912, by Allen & Peck, Inc., with J. N. Shannahan as general

"Economical management"

The above is an extract from an article in Electric Railway Journal, July 10, 1915, describing features in the "Economical Management and Good Housekeeping" at the Hampton shops of

Newport News and Hampton Railway, Hampton, Va.

They have tested "Tool Steel" gears and pinions since August 1908.

They ought to know.

THE TOOL STEEL GEAR AND PINION CO.
CINCINNATI, OHIO

1926



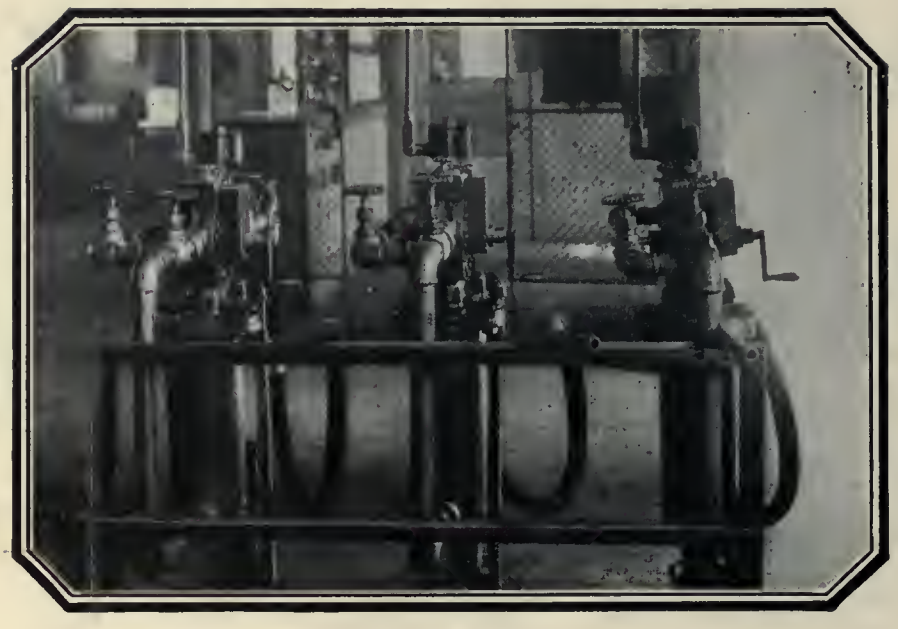
Eighteen years ago they tested their first "Tool Steel" gear installation. By 1915 they had standardized on them. The above advertisement published by us in 1915 told the story then, and is just as suitable today.

This road is but one of many long-satisfied customers—a condition which indicates that "Tool Steel" Gears *do give the service.*

The Tool Steel Gear & Pinion Company
Cincinnati, Ohio

The Standard of Quality

TOOL-STEEL QUALITY GEARS AND PINIONS



Automatic barreling device, supplies determined quantity automatically. A great labor saver. Always accurate.

The pump for out-in-the-open service

ARE YOU fueling gas-electric cars—busses or feeder lines—or short haul trucks?

No matter what your fueling problem is, Bowser can help solve it. We build gas and oil storage and pumping equipment of all kinds—and our engineers are experienced in railway work.

For instance, the pump illustrated here is ideal for out-in-the-weather service. No weather can interfere with the smooth operation of this pump—the famous Chief Sentry used at garages and filling stations the world over. It is a 5-gallon pump of unsurpassed merit for right-of-way fueling needs. It was designed to withstand the corrosive effects of out-in-the-weather service.

Bowser supplies other complete equipment for handling, storing and disbursing gasoline, signal oil, lubricating oils, etc.—knows by long experience what equipment will best meet each specific need. For details of our complete railroad service, please address Dept 51.



This is our standard 55-gallon lubricating oil outfit. Other sizes; other styles.

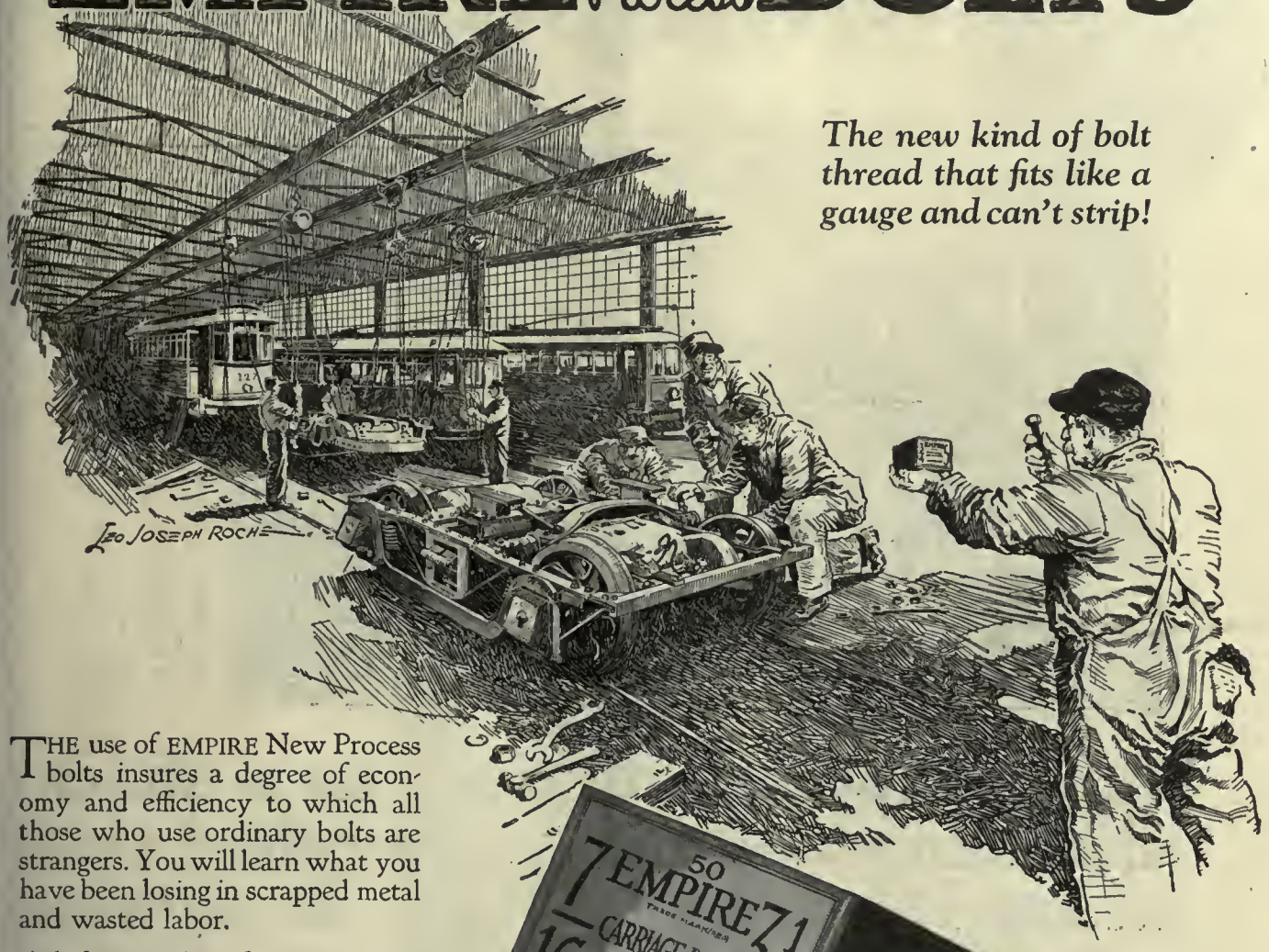


This is sturdy 102—famous Chief Sentry

S. F. BOWSER & COMPANY, Inc.
Pump and Tank Headquarters
FORT WAYNE, INDIANA.

EMPIRE New Process BOLTS

The new kind of bolt thread that fits like a gauge and can't strip!



THE use of EMPIRE New Process bolts insures a degree of economy and efficiency to which all those who use ordinary bolts are strangers. You will learn what you have been losing in scrapped metal and wasted labor.

Ask for samples of EMPIRE New Process bolts and compare them as to thread, fit and strength with any bolt made.



Special display cartons have size and style conspicuously lettered. You find the bolt you want at a glance.



RUSSELL, BURDSALL & WARD BOLT & NUT COMPANY

PORT CHESTER, N.Y.

Branch Office: Straus Building	Branch Office: General Motors Bldg.	Branch Factory:	Scrimple & Gillette 169 Jackson Street	Maydwell & Hartzell, Inc. 158-168 Eleventh Street
CHICAGO	**DETROIT**	**ROCK FALLS, Ills.**	**SEATTLE**	**SAN FRANCISCO**

Makers of Bolts, Nuts and Rivets Since 1845



Shopped Cars

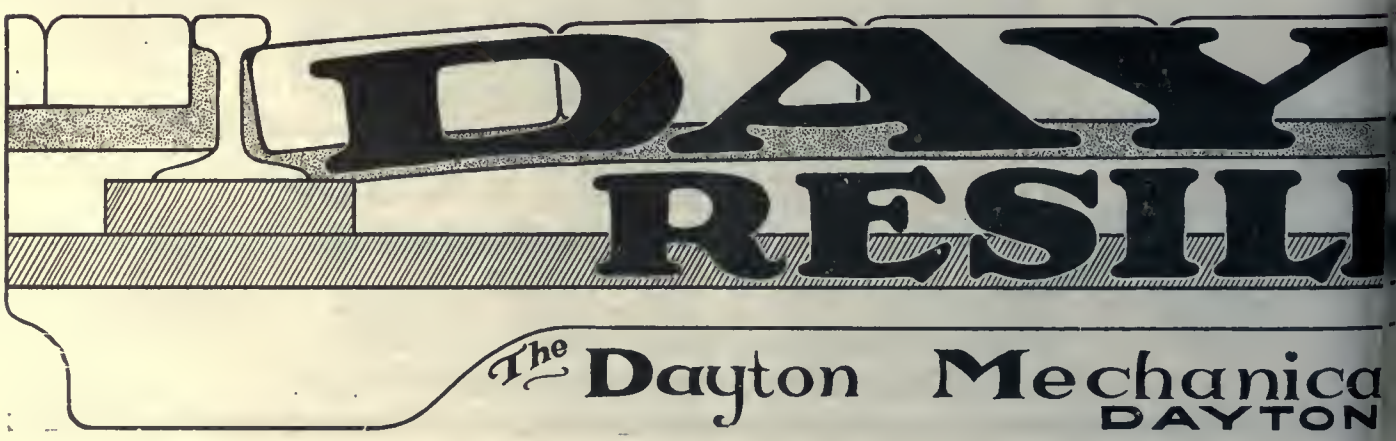


Rolling Stock in Here Loses Rather Than Earns Money.

Permanent smooth track on a shock-absorbing base helps keep rolling stock where it belongs . . . . . in service

No one knows better than your own shop force that it isn't ordinary wear that puts cars in the shop so often. Good lubrication takes care of most wear.

Shock and vibration shake your cars to pieces. Pounding along over rough track, or rigid track, bumping over sunken joints and switches and crossovers where the foundation has gone or is beginning to disintegrate—these are the things that make rolling stock maintenance expensive.



arn No Dividends

Track built upon Dayton Resilient (shock-absorbing) Ties saves rolling stock, saves shop expense. The vibration and shock of traffic is ABSORBED by the wood block and asphalt cushion construction. The foundation does not break down, not for many years, if at all. A permanently smooth maintenance free track even at joints, switches, and crossovers and reduced expense for car upkeep are two results that you can measure by the meter we all understand—net profits, money.

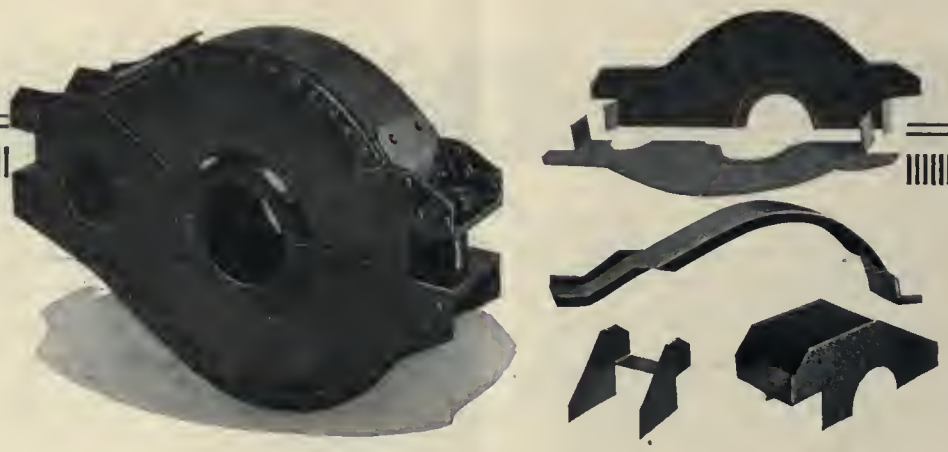
Despite this, Dayton Tie Track actually costs less to put in. We'll gladly give you figures and construction details. Write us.



Keep Rolling Stock on the Streets and Red Ink Out of the Books.

TON
ENT TIES

Tie Company
CHIO



Are Your Gear Cases "Bump-Proof"?

A PRIME essential of a gear case is its ability to withstand the shocks and vibration of a bumpy road. This means that the case must be strong to a lasting degree—bump-proof—yet not too heavy.

Columbia Steel Gear Cases are light without sacrifice of strength or durability.

To reduce breakage the cases are reinforced at points where the strain is greatest. For instance, there are three thicknesses of metal at the supports where suspension brackets are riveted on.

The top and bottom of the cases are flanged over making them oil and dust proof in all temperatures.

Columbia Malleable Iron Gear Cases are made on the same general designs as the steel cases. While slightly heavier, they are superior in wearing quality, and we recommend their use wherever practical.

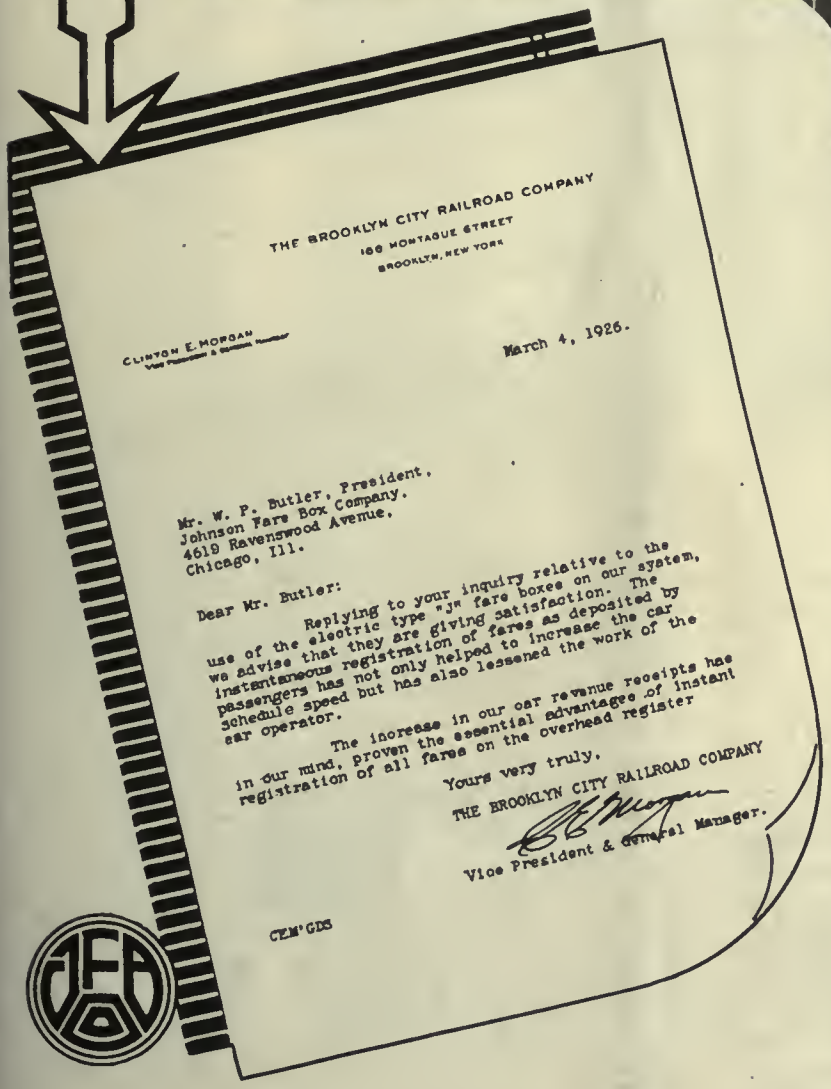
May we submit estimates and further details on gear cases—or on any other Columbia products?

The
COLUMBIA MACHINE WORKS
and Malleable Iron Company

Chestnut St. and Atlantic Ave. Brooklyn, N. Y.







THE BROOKLYN CITY RAILROAD COMPANY
168 MONTAGUE STREET
BROOKLYN, NEW YORK

CLINTON E. MORGAN

March 4, 1926.

Mr. W. P. Butler, President,
Johnson Fare Box Company,
4619 Ravenswood Avenue,
Chicago, Ill.

Dear Mr. Butler:

Replying to your inquiry relative to the use of the electric type "J" fare boxes on our system, we advise that they are giving satisfaction. The instantaneous registration of fares as deposited by passengers has not only helped to increase the car schedule speed but has also lessened the work of the car operator.

The increase in our car revenue receipts has in our mind, proven the essential advantages of instant registration of all fares on the overhead register

Yours very truly,

THE BROOKLYN CITY RAILROAD COMPANY

Vice President & General Manager.

CEM'GDS

THEIR PREFERENCE

THE Brooklyn City Railroad was not satisfied merely with collecting fares on the Brooklyn operation. They wanted them *registered* at the source, because they were convinced that there was a world of difference between "collecting fares" and "registering fares."

With Johnson "J" equipment, they *knew* that they could stop *preventable* revenue losses, and have *absolute accuracy* through the security of audible, visible and instantaneous registration.

The Johnson Full Automatic Electrical Fare Box eliminates guesswork in fare collection. If you are interested in Fare Collection for its effect on net profits, we'll be glad to analyze your operation with regard to the adaptability of the "J" and how quickly it can conservatively be expected to amortize its investment cost.

JOHNSON FARE BOX CO.

CHICAGO, ILL.
4619 Ravenswood Ave.

NEW-YORK, N.Y.
2 W. 61st St.

AM CRE CO Creosoted Southern Yellow Pine POLES



Are Protected From Decay

THE Southern Yellow Pine Tree trimmed and framed makes an excellent pole, and its excellency endures as long as it is protected from decay and deterioration.

Experience has demonstrated that this can best be accomplished by full pressure treatment with pure coke oven or coal gas tar creosote oil. Creosote oil is highly toxic to decay producing fungi and when diffused throughout the cells of a pine pole, by pressure treatment, presents an invulnerable defense against wood destroying organisms and animal life. This protection is not superficial, but extends throughout the sapwood and into the heartwood content of the pole giving full protection in the event of mechanical abrasion.

Creosote oil is very stable and will remain and function in the pole for long periods. A creosoted yellow pine pole can, therefore, be counted on for practically its original strength throughout its mechanical life. This makes for efficiency and low annual cost, which are the outstanding advantages of these poles.

May we give you further information on creosoted yellow pine poles when you are considering lines?



AMERICAN CREOSOTING COMPANY
INCORPORATED

COLONIAL CREOSOTING COMPANY INCORPORATED

AM CRE CO LOWRY PROCESS CREOSOTED WOOD

GEORGIA CREOSOTING COMPANY INCORPORATED

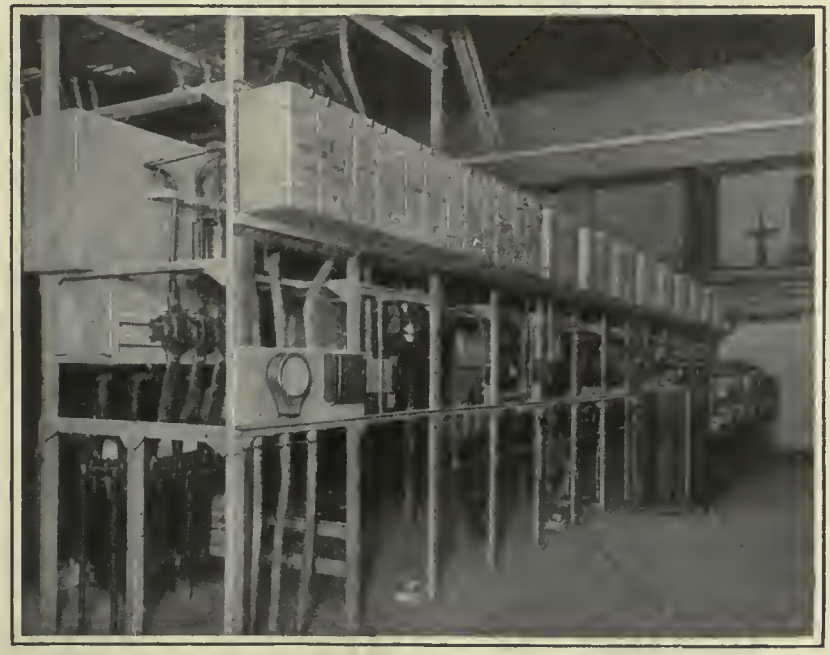
LOUISVILLE ~ KENTUCKY

SALES OFFICES

350 MADISON AVE NEW YORK CITY ~ 401 W. MAIN ST. LOUISVILLE, KY.

BOGALUSA, LA. BRUNSWICK, GA.

Asbestos Transite



Construction by Post-Glover Electric Company, Cincinnati, Ohio, in Newport substation of the Union Gas and Electric Co., Cincinnati, Ohio.

FOR general electrical construction where material must be fireproof and heat-resisting, use Transite Asbestos Wood. While lighter and less expensive than concrete construction, these panels are strong and rigid. Their all-mineral composition enables them to withstand the most severe fire tests and sudden changes in temperature. And their smooth, clean surface never needs painting or other upkeep.

The list of electrical uses for Transite Asbestos Wood is long and we would like to send it to you.

JOHNS-MANVILLE Inc., 292 Madison Avenue, at 41st Street, New York City

Branches in all large cities For Canada: CANADIAN JOHNS-MANVILLE CO., Ltd., Toronto

JOHNS-MANVILLE

Through Electrical Materials for Utilities Jobber Contractor and Dealer

The creation and maintenance of car advertising space values requires the same degree of highly specialized knowledge as the construction and maintenance of railroads. Such tasks should be delegated only to those of widest experience and longest record of success.



Barron G. Collier
INCORPORATED
CANDLER BLDG. NEW YORK

Each of Your Salesmen Should Have the 1926 Edition Electric Railway Directory

Because:—

All purchases are passed upon by two and often three officials before the order is placed. If your salesmen are not procuring orders they are not interviewing the proper officials.

With 65% changes in this directory over 1925, it is very important your salesmen are directed right to save time and possibly embarrassment.

$296,000,000 will be spent this year for new equipment, material and supplies—Can your salesmen afford to make one false step on his introduction?

The above holds true respecting your mailing lists. With six changes for each property listed makes your old mailing list practically worthless.

It is too expensive to have your literature go wrong. In fact the directory pays for itself many times over the first campaign.

Price $7.50 for one copy—

10% off for five or more.

Leading Features

1—Complete list of every recorded electric railway company in the United States, Canada, Mexico, and the West Indies.

2—List and addresses of officials, superintendents, department heads and purchasing agents, corrected to date of issue.

3—Addresses of companies operating buses.

4—Addresses of bus repair shops.

5—Mileage of track and bus routes.

6—Number and kinds of cars used.

7—Rates of fare.

8—Amusement parks owned or reached.

1

Directory Department, Electric Railway Journal, 10th Avenue and 36th St., New York, N. Y.

Gentlemen:—Will you please send me:

.....copies of 1926 McGraw Electric Railway Directory, check for $..... enclosed.

.....More complete information concerning contents.

Name .....

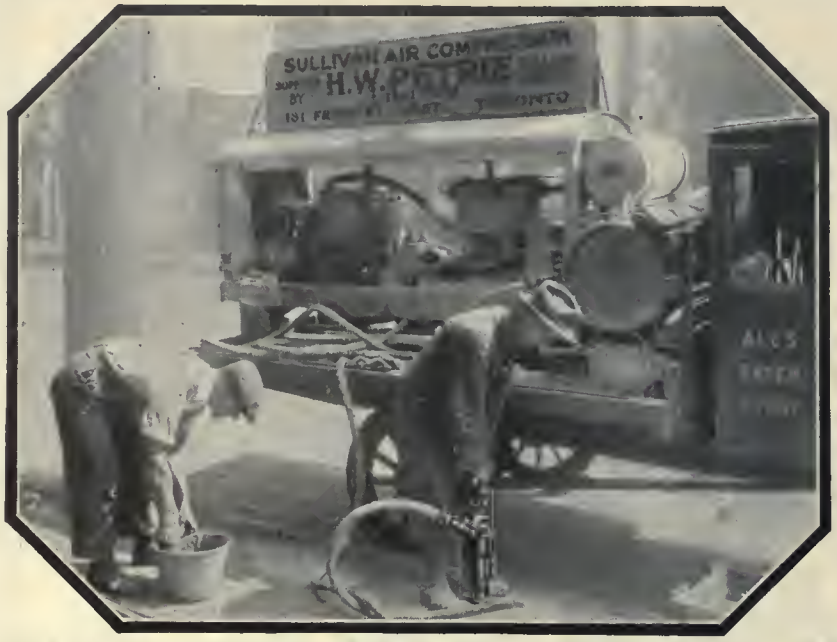
Company .....

Street .....

City .....State .....

E.R.J. 5-15-26

Air Power Aids Patriotism In Toronto



SEVEN HUNDRED Toronto merchants bought flags and flagstaffs to put them on.

Seven hundred holes in the sidewalk were needed to hold the flagstaffs.

Seven hundred half hours to do the drilling by hand? Too long!

A *Sullivan Portable Compressor* mounted on a Ford truck ran a *Sullivan 29-lb. Rotator.* They put in the 700 holes—not in 700 minutes, but in a small fraction of the time estimated for hand drilling.

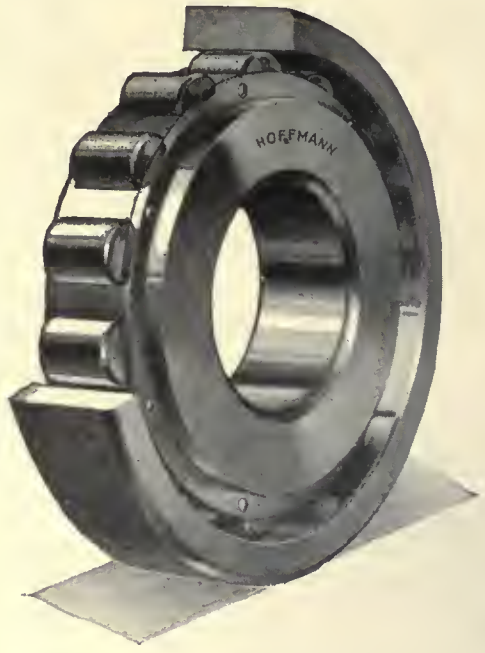
Have you a little job like that, or a lot of them? Your company can save money and earn more profits by owning a Sullivan Portable Compressor and Sullivan Air Tools, Rotators, Busters, Spaders, Portable Hoists.

Catalogue 3283-*D.*

SULLIVAN MACHINERY COMPANY

150 SOUTH MICHIGAN AVE., CHICAGO, ILLINOIS U.S.A.

SHOCK-ABILITY



The sturdy **"Hoffmann"** Precision Roller Bearing—with its big solid rollers and full-line contact between rollers and races—will stand up under the shocks of sudden overloads, jars and vibration which quickly destroy a less rugged bearing. Yet its Precision Quality is such that it safely carries the highest speeds, smoothly and sweetly.

Write for Catalog 904

NORMA-HOFFMANN BEARINGS CORPORATION

Stamford — Connecticut

PRECISION BALL, ROLLER AND THRUST BEARINGS

"HOFFMANN"

Keep Your H-B Life Guards in Good Working Order

So you will get MAXIMUM EFFICIENCY and LOWEST MAINTENANCE

We can make prompt shipment of guards and parts and they are made right of the best materials and workmanship.

H-B LIFE GUARDS

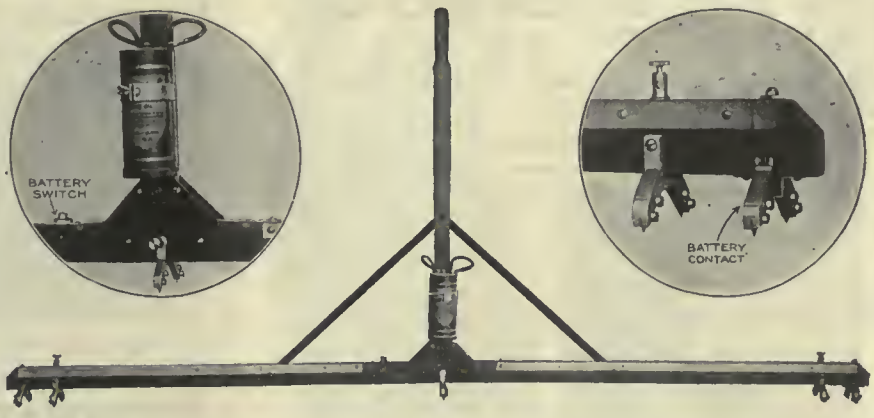
Manufactured by

THE CONSOLIDATED CAR FENDER COMPANY

Providence, R. I.

Wendell & MacDuffie Co., General Sales Agents
110 East 42nd St., New York N. Y.

The New
ROLLER-SMITH
Type BBT
Bond Tester and Contact Bar



the most important development in bond testing in years

The new R-S Type BBT Bond Tester is intended for use where the current in the rail is comparatively feeble or where such current is absent, as on new construction or at the ends of trolley lines where no cars are running beyond the point where tests are being made.

The R-S Type BBT Bond Tester has over five times the sensitivity of the most sensitive bond tester heretofore made. *It can be successfully used with the current from a single No. 6 dry cell.* This dry cell and the battery switch and contacts are clearly shown in the illustration above.

Every man who is any way interested in bond testing should know all about this new instrument. If you will fill in and forward the coupon below a copy of new Bulletin No. G-200 will be sent you promptly. Or, better still, get in touch with the R-S office nearest you. There is one in every principal city.

"Over thirty years experience is back of Roller-Smith"

ROLLER-SMITH COMPANY
Electrical Measuring and Protective Apparatus

Main Office: 2128 Woolworth Bldg., N.Y.
Works: Bethlehem, Penna.

Offices in Principal Cities in United States and Canada
Also in Havana, Cuba

Roller-Smith Co.,
2128 Woolworth Bldg., New York City, N. Y.

Please send new Bulletin G-200.

Name.....

Company.....

City.....State.....

Position.....

BUDA
ESTABLISHED
1881



For the Best in Track Work

Forty-five years experience and the best of modern facilities.

Send Us Your Inquiries

THE BUDA CO.
Harvey, Ill.

Get Ready for Summer Autoists

N-A-C-H-O-D

Highway Crossing Signals



N-A-C-H-O-D Spells Safety —for railway company as well as road user. The most foolhardy driver can't fail to get at least one of three distinct warnings—ring, flash and wig-wag. And remember, the cost of one accident saved will usually more than pay for a complete Nachod installation.

Automatic Block Signals

Nachod and "United States" types made to meet every operating requirement. Track capacity and speed are enhanced by proper application of suitable signals.

Headway Recorders

Nachod Headway Recorders furnish continuous and accurate records for checking car operation at any point.

Nachod & United States Signal Co., Inc.,
4777 Louisville Avenue, Louisville, Ky.
English Representative:
Forest City Electric Co., Ltd., Manchester, Eng.



TRUCK WITH TOWER IN RUNNING POSITION

TRENTON TOWER

This 3-Section

is not only more convenient, but stronger than the older type.

The top section is reinforced by the intermediate section. The 3-section design makes it possible to raise the platform 16 inches higher and drop it 12 inches lower than can be done with the old-style 2-section tower.

We'll gladly send you details.

J. R. McCARDELL CO.
Trenton, New Jersey, U. S. A.

Nuttall



NUTTALL
Tapered Roller Bearing Trolley Base

Type US No. 20A

Here is the latest Nuttall Trolley Base incorporating the famous Timken Roller Bearing — a tapered double-race roller bearing which has been designed by this manufacturer especially for trolley base service.

Particularly interesting features of this new base include extreme sensitiveness, with swiveling strains evenly distributed on bearings; oil and grease reservoirs for lubrication of bearings and pole socket axle pin respectively; quick, easy lubrication only once in six months.

Full specifications on request

MEMBER AMERICAN ELECTRIC RAILWAY MANUFACTURERS ASSOCIATION AERA 1926

R. D. NUTTALL COMPANY
PITTSBURGH PENNSYLVANIA

All Westinghouse Electric & Mfg. Co. District Offices are Sales Representatives in the United States for the Nuttall Electric Railway and Mine Haulage Products. In Canada: Lyman Tube & Supply Co., Ltd., Montreal and Toronto.

Within your arm's reach

—the economic facts about public utility problems

Economics of Public Utilities
By L. R. NASH

Public Utility Engineer, Stone and Webster, Inc.

413 pages, 6x9. $4.00 net, postpaid.

This book presents the essential facts and the most mature views upon the underlying financial and economic phases of public utility companies, with particular emphasis on electric railways, electric light and power companies and gas companies. It discusses every angle of the public utility *as a business* and treats thoroughly such subjects as capitalization, investment features, franchises, regulation, valuation, depreciation, taxes, rates, service, accounting methods, public relations, etc.

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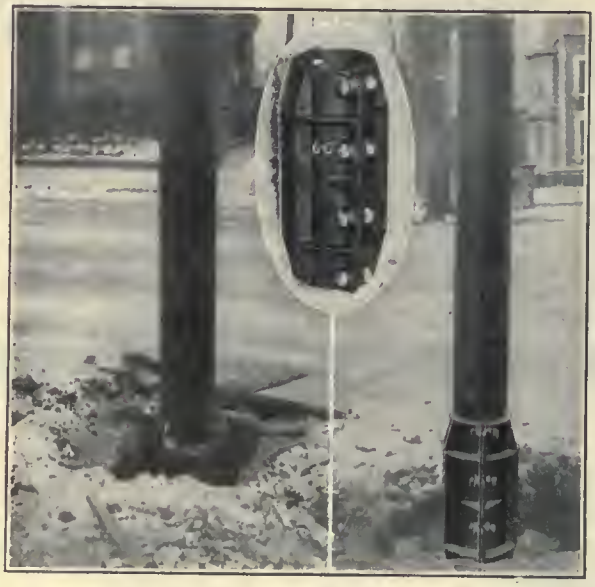
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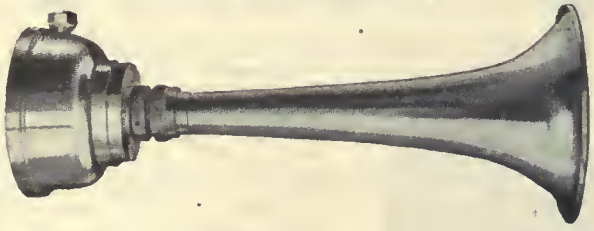
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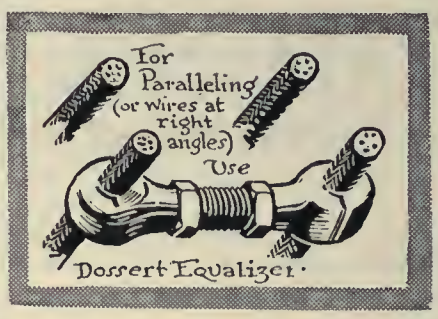
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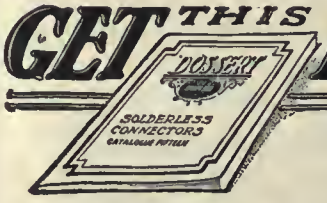
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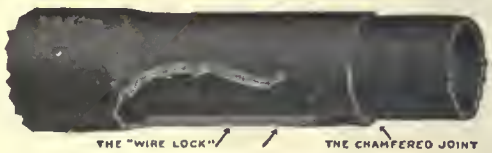
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Westinghouse E. & M. Co.

Controller Regulators
Elec. Service Supplies Co.

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Westinghouse E. & M. Co.

Converters, Rotary
General Electric Co.
Westinghouse E. & M. Co.

Conveying & Hoisting Machinery
American Bridge Co.

Copper Wire
American Brass Co.
Anaconda Copper Mining Co.
Rome Wire Co.

Copper Wire Instruments Measuring Testing and Recording
American Brass Co.
American Steel & Wire Co.
Anaconda Copper Mining Co.

Cord, Bell, Trolley, Register
Brill Co., The J. G.
Elec. Service Supplies Co.
International Register Co.
Roebling's Sons Co., J. A.
Samson Cordage Works

Cord Connectors and Couplers
Elec. Service Supplies Co.
Samson Cordage Works
Wood Co., Chas. N.

Couplers, Car
American Steel Foundries
Brill Co., The J. G.
Ohio Brass Co.
Westinghouse Tr. Br. Co.

Cranes, Hoist & Lift
Electric Service Supplies Co.

Cross Arms (See Brackets)

Crossing Foundations
International Steel Tie Co.

Crossings
Ramapo Ajax Corp.
Wm. Wharton Jr. & Co., Inc.

Crossing, Frog and Switch
Ramapo Ajax Corp.
Wm. Wharton, Jr. & Co., Inc.

Crossing Manganese
Bethlehem Steel Co.
Ramapo Ajax Corp.
Wm. Wharton Jr. & Co., Inc.

Crossings, Track (See Track Special Work)

Crossings, Trolley
Ohio Brass Co.
Westinghouse E. & M. Co.

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Edwards Co., Inc., G. M.
Morton Mfg. Co.
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Hyman Michaels Co.
Sachsenmaier Co., Geo.
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Derailing Devices (See also Track Work)

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Ramapo Ajax Corp.

Destination Signs
Columbia Machine Wks.
Electric Service Supplies Co.

Detective Service
Wish-Service, P. Edward

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Consolidated Car Heating Co.
Nat'l Pneumatic Co., Inc.

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Edwards Co., Inc., O. M.
General Electric Co.
Hale-Kilburn Co.

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Nat'l Pneumatic Co., Inc.

Drills, Rock
Sullivan Machinery Co.

Drills, Track
Amer. Steel & Wire Co.
Elec. Service Sup. Co.
Ohio Brass Co.

Dryers, Sand
Elec. Service Supplies Co.
Ohio Brass Co.
Westinghouse E. & M. Co.

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Columbia Machine Works
Electric Service Supplies Co.
Ohio Brass Co.
Westinghouse E. & M. Co.

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Railway Trackwork Co.

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American Steel & Wire Co.
Roebling's Sons Co., John A.
Rome Wire Co.

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American Bridge Co.

Electrodes, Carbon
Railway Trackwork Co.
Una Welding & Bonding Co.

Electrodes, Steel
Railway Trackwork Co.
Una Welding & Bonding Co.

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Archbold-Brady Co.
Beeler, John A.
Buchanan & Layng Corp.
Bylleaby & Co., H. M.
Day & Zimmermann, Inc.
Drum & Co., A. L.
Ford, Bacon & Davis
Hemphill & Wells
Holst, Engelhardt W.
Jackson, Walter
Kelker & DeLeuw
McClellan & Junkersfeld
Richey, Albert S.
Sanderson & Porter
Stevens & Wood, Inc.
Stone & Webster
White Eng. Corp., The J. G.

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Westinghouse E. & M. Co.

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Johnson Fare Box Co.
Nat'l Ry. Appliance Co.
Ohmer Fare Register Co.
Perey Mfg. Co., Inc.

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Electric Service Sup. Co.
Ohmer Fare Register Co.

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Consolidated Car Fender Co.
Root Spring Scraper Co.
Star Brass Works
Wood Co., Chas. N.

Fibre and Fibre Tubing
Westinghouse E. & M. Co.

Field Coils (See Coils)

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Valentine & Co.

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W. S. Godwin Co., Inc.

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Nat'l Ry. Appliance Co.

Floodlights
Elec. Service Supplies Co.

Floor, Sub.
Haskelite Mfg. Corp.

Flooring, Monolithic
Johns-Manville, Inc.

Floors
Haskelite Mfg. Corp.

Forgings
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Carnegie Steel Co.
Standard Steel Works

Frogs & Crossings, Tee Rail
Bethlehem Steel Co.
Ramapo Ajax Corp.
Wm. Wharton Jr. & Co., Inc.

Frogs, Track (See Track Work)

Frogs, Trolley
Electric Service Supplies Co.
Ohio Brass Co.
Westinghouse E. & M. Co.

Funnell Castings
Wm. Wharton, Jr. & Co., Inc.

Furnaces, Electric, Steel Melting
American Bridge Co.

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Columbia Machine Wks.
Consolidated Car Heating Co.
General Electric Co.
Westinghouse E. & M. Co.

Fuses, Refillable
General Electric Co.

Gaskets, Asbestos
Johns-Manville, Inc.
Westinghouse Tr. Br. Co.

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General Electric Co.
Westinghouse E. & M. Co.

Gas Producers
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Brill Co., The J. G.

Gauges, Oil & Water
Ohio Brass Co.

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Brill Co., The J. G.
Carnegie Steel Co.
Standard Steel Works

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Ludlum Steel Co.

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Hale-Kilburn Co.
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Shovels
Brill Co., The J. G.
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Shovels, Power
Bull Co., The J. G.

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Electric Service Sup. Co.
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Wood Co., Chas. N.

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Nachod & U. S. Signal Co.

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Nichols-Lintern Co.

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Standard Steel Works

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Brill Co., The J. G.
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Steel Flooring
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Brill Co., The J. G.
Morton Mfg. Co.

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Westinghouse E. & M. Co.

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Electric Service Sup. Co.
General Electric Co.
Westinghouse E. & M. Co.

Switches, Selector
Nichols-Lintern Co.

Switches, Tee Rail
Ramapo Ajax Corp.

Switches, Track (See Track Special Work)

Synchroscopes
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Tampers, Tie
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(Continued on page 74)

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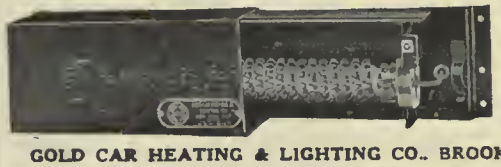
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ALPHABETICAL INDEX TO ADVERTISEMENTS

Page

A

Allison & Co., J. E. 24
American Brake Shoe & Foundry Co. 40
American Brass Co., The 73
American Bridge Co. 67
American Car Co. 38-39, 75
American Car and Foundry Motors Co. 26
Americao Creosoting Co. 56
American Electrical Works 71
American Insulating Mach. Co. 71
American Steel Foundries 19
American Steel & Wire Co. 66
American Strombos Co. 64
Anaconda Copper Mining Co. 73
Archbold-Brady Co. 25

B

Babcock & Wilcox Co. 68
Bayonet Trolley Harp Co. 65
Beeler Organization, The 24
Bell Lumber Co. 73
Bethlehem Steel Co. 67
Bowser & Co., Inc., S. F. 50
Brill Co., The J. G. 38-39, 75
Buchanan & Layng Corporation. 24
Buda Co., The 62
Byllesby Engineering & Management Corp. 24

C

Cameron Electrical Mfg. Co. 71
Carnegie Steel Co. 67
Chillingworth Mfg. Co. 73
Clark-Williams Engineering Co. 64
Cleveland Fare Box Co., The 73
Collier, Inc., Barron G. 58
Columbia Machine Works 54
Consolidated Car Fender Co., The. 61
Consolidated Car Heating Co. 73
Cummings Car & Coach Co. 37

D

Day & Zimmermann, Inc. 24
Dayton Mechanical Tie Co. 52-53
Differential Steel Car Co., The 67
Dossert & Co. 66
Doyle, Kitchen & McCormick Inc. 27
Drum & Co., A. L. 24

E

Earll, C. I. 64
Edwards Co., O. M. 29

Page

Egyptian Lacquer Mfg. Co., The. 30
Electric Equipment Co. 69
Electric Railway Equipment Co. 68
Electric Railway Improvement Co. 29
Electric Service Supplies Co. 7
Electric Traction & Bus Co. 69

F

Fageol Motors Co. 26
Ford, Bacon & Davis, Inc. 24
Ford Chain Block Co. 66
"For Sale" Ads. 69

G

Garford Motor Truck Co., The . 33
General Electric Co. ..... 22, Back Cover
General Tire & Rubber Co., The. 28
Globe Ticket Co. 16
Godwin Co., Inc., W. S. 25
Gold Car Heating & Ltg. Co. 73
Goodyear Tire and Rubber Company, The 34 35

H

Hale-Kilburn Co. 73
Haskelite Mfg. Corp. 73
"Help Wanted" Ads. 69
Hemingray Glass Co. 65
Hemphill & Wells 24
Heywood-Wakefield Co. 26
Holst, Englehardt W. 24
Hubbard & Co. 71
Hyatt Roller Bearing Co., Insert 41-42
Hyman-Michaels Co. 60

I

International Creosoting & Construction Co. 10
International Motor Co., Inc. 8-9
International Register Co. 68
International Steel Tie Co., Front Cover
Irvington Varnish & Insulator Co. 71

J

Jackson, Walter 24
Jeandron, W. J. 64
Johns-Manville Inc. 57
Johnson & Co., J. R. 25
Johnson Fare Box Co. 55

Page

K

Kelker, DeLeuw & Co. 25
Kuhlman Car Co. 38-39, 75

L

Le Carbone Co. 64
Lorain Steel Co., The 67
Ludlum Steel Co. 67

M

Mack Trucks, Inc. 8-9
McCardell Co., J. R. 62
McClellan & Junkersfeld 24
McGraw-Hill Book Co., Inc. 63
Metal & Thermit Corp. 17
Mica Insulator Co. 66
Miller Trolley Shoe Co. 46
Morton Mfg. Co. 25

N

Nachod and United States Signal Co., Inc. 62
National Brake Co., Inc. 23
National Pneumatic Co. 15
National Railway Appliance Co. 66
Naugle Pole & Tie Co. 73
Nichols-Lintern Co., The 18
Norma-Hoffman Bearing Corp. 60
Nuttall Co., R. D. 63

O

Ohio Brass Co. 5
Ohmer Fare Register Co. 65
Okonite-Callender Cable Co., Inc. The 71
Okonite Co., The 71

P

Pantasote Co., Inc. 65
Percy Mfg. Co., Inc. 73
Portland Cement Association 25
Positions Wanted and Vacant 69

R

Railway Trackwork Co. 4
Railway Utility Co. 73
Ramapo-Ajax Corp. 71
Richey, Albert S. 24
Roebling's Sons Co., John A. 73
Roller-Smith Co. 61
Rome Wire Co. ..... Insert 31-32

Page

Rooke Automatic Register Co. 68
Root Spring Scraper Co. 73
Russell, Burdsall & Ward Bolt & Nut Co. 51

S

S K F Industries, Inc. 44
Sachsenmaier Co., Geo. 69
Salzberg Co., Inc., H. E. 69
Samson Cordage Works 73
Sanderson & Porter 24
Searchlight Section 24
Sharp, Edw. P. 68
Smith Heater Co., Peter 73
Standard Oil Company 48
Standard Steel Works Co. 43
Star Brass Works 68
Stevens & Wood, Inc. 24
Stone & Webster, Inc. 24
Stucki Co., A. 25
Sullivan Machinery Co. 60

T

Texas Company 47
Thornton Trolley Wheel Co. 68
Timken Roller Bearing Co., The. 36
Tool Steel Gear and Pinion Co., The 49

U

Una Welding & Bonding Co. 25
Universal Lubricating Co. 71

V

Valentine and Co. 45

W

"Want" Ads 69
Wason Mfg. Co. 38-39, 75
Westinghouse Electric & Mfg. Co. 2
Westinghouse Traction Brake Co. 6
Wharton, Jr., & Co., Wm. 67
"What and Where to Buy", 70, 72, 74
White Engineering Corp., J. G. .. 24
Wish Service, The P. Edw. 25
Wood Co., Chas. N. 73

Y

Yellow Truck and Coach Manufacturing Co. ..Insert 11-12-13-14

WHAT AND WHERE TO BUY—Continued from page 72

Tapes and Cloths (See Insulating Cloth, Paper and Tape)

Tee Rail Special Track Work
Bethlehem Steel Co.
Ramapo Ajax Corp.
Wm. Wharton, Jr. & Co., Inc.

Telephones and Parts
Electric Service Sup. Co.

Testing Instruments (See Instruments, Electrical Measuring, Testing, etc.)

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Consolidated Car Heating Co.
Gold Car Heating & Lighting Co.
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Dayton Mechanical Tie Co.

Ties and Tie Rods, Steel
Carnegie Steel Co.
Godwin Co., Inc., W. S.
International Steel Tie Co.
Ludlum Steel Co.

Ties, Wood Cross (See Poles, Ties, Posts, etc.)

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Goodyear Tire & Rubber Co.

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Bethlehem Steel Co.
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Amer. Steel & Wire Co.
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Railway Trackwork Co.

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Trackless Trolley Cars
Brill Co., The J. G.

Transfer (See Tickets)

Transfer Issuing Machines
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Transfer Tables
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Transformers
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Treads, Safety, Stair Car Step
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Brill Co., The J. G.
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Wheel Guards (See Fenders and Wheel Guards)

Wheel Presses (See Machine Tools)

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American Steel Foundries
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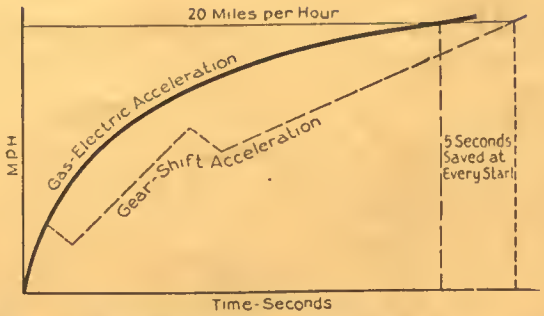
MANY electric railways are demonstrating the importance of comfortable seats in creating favorable public relations. Greater consideration is being given to this factor, resulting in the development of many types of car seats in which comfort and appearance are outstanding features.

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ELECTRIC RAILWAY JOURNAL



H. S. Williams, *Assistant Superintendent of Equipment of the Department of Street Railways, City of Detroit. Mr. Williams is an authority on problems of noise reduction, and is Chairman of the Noise Reduction Committee of the A. E. R. E. A.*

"To reduce noise in car operation"

"SOMETHING must be done to dampen the vibrations set up in the track rails if we are to go the limit in our efforts to reduce the noise in car operation."

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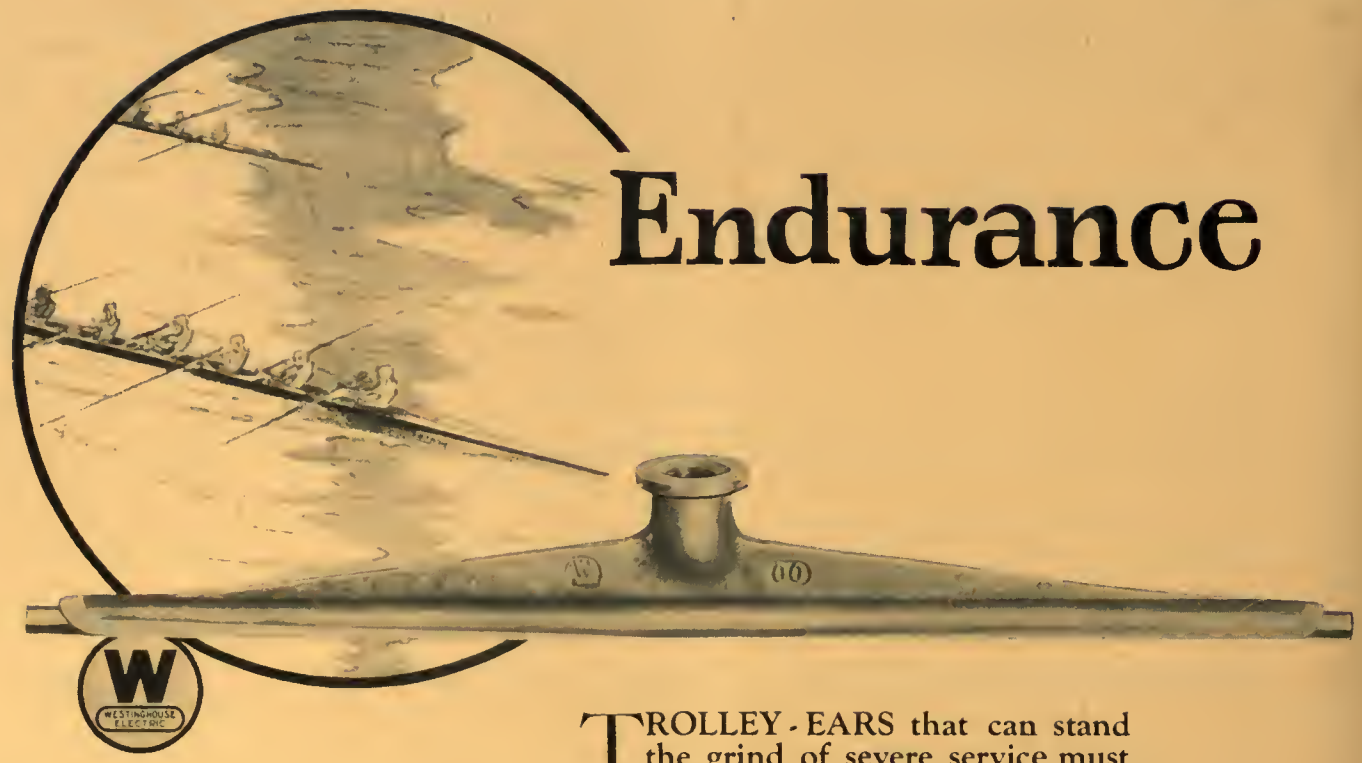
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Vol. 67
No. 21

Pages
871-910

CONTENTS

MAY 22, 1926

Editorials 871

New Cars More Than Pay Their Way 874

The Atlanta management believes in modern rolling stock and started on its campaign of replacing old cars with new in 1922. One hundred and twenty new city cars, about one-third of the total number, have been ordered during 1925 and 1926.

Interstate Bus Regulation Desirable 877

BY JOHN A. RITCHIE.

The history of all industry shows that control of competition between utilities is desirable. Interests of manufacturers of automotive vehicles should gain, as risk would be removed. Mistakes of earlier regulation should be avoided.

Texas Properties Are Getting Results from Good Merchandising Work 879

BY JOHN A. DEWHURST.

Houston, Galveston, Beaumont, El Paso, Austin, San Antonio, Dallas and Fort Worth companies, each with its own peculiar problems, recognize transportation as a competitive industry, and are energetically developing modern merchandising methods. Efforts are being made to relieve traffic congestion and eliminate packing.

Railway Operates from Union Bus Station in Rochester 882

Better Car Routing and Traffic Control Proposed for Baltimore 883

Report presented to traffic survey commission of Baltimore by Kelker, De Leuw & Company proposes radical changes in street car lines and handling of vehicle traffic, particularly in central business district. Many detailed counts taken show seriousness of the problem.

Time for Ticket Sorting Reduced 50 per Cent 889

Maintenance Notes 890

Association News and Discussions 893

Control of Inventories 893

BY W. F. MAHER.

Quantity Buying for Small Railways 893

BY A. B. FULLER.

American Association News 895

News of the Industry 897

Recent Bus Developments 902

Financial and Corporate 904

Personal Mention 907

Manufacturers and the Markets 908

Grand Rapids Leads the Way

A COMPLETELY illustrated article on the new Grand Rapids cars built by the St. Louis Car Company will appear in next week's issue of ELECTRIC RAILWAY JOURNAL.

At the Atlantic City convention last fall, much discussion was provoked by the three sample cars exhibited by L. J. DeLamarter, vice-president and general manager of the Grand Rapids Railway.

Now comes delivery of the 27 cars which are the outgrowth of this experiment. They include many novel ideas. Can street cars be more attractive to passengers? Mr. DeLamarter believes they can! He has faith in the possibilities of the street car. He has made a strenuous effort to stimulate improvement.

Street railway men who are thinking in terms of more modern transportation equipment should find next week's article of more than ordinary interest. There is food for thought in the Grand Rapids cars.

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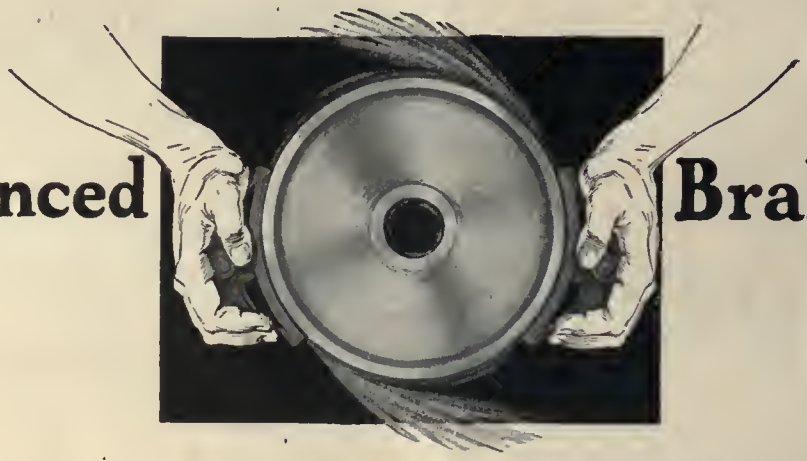
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Advertising Index—Alphabetical, 42; Classified, 38-40-42; Searchlight Section, 37

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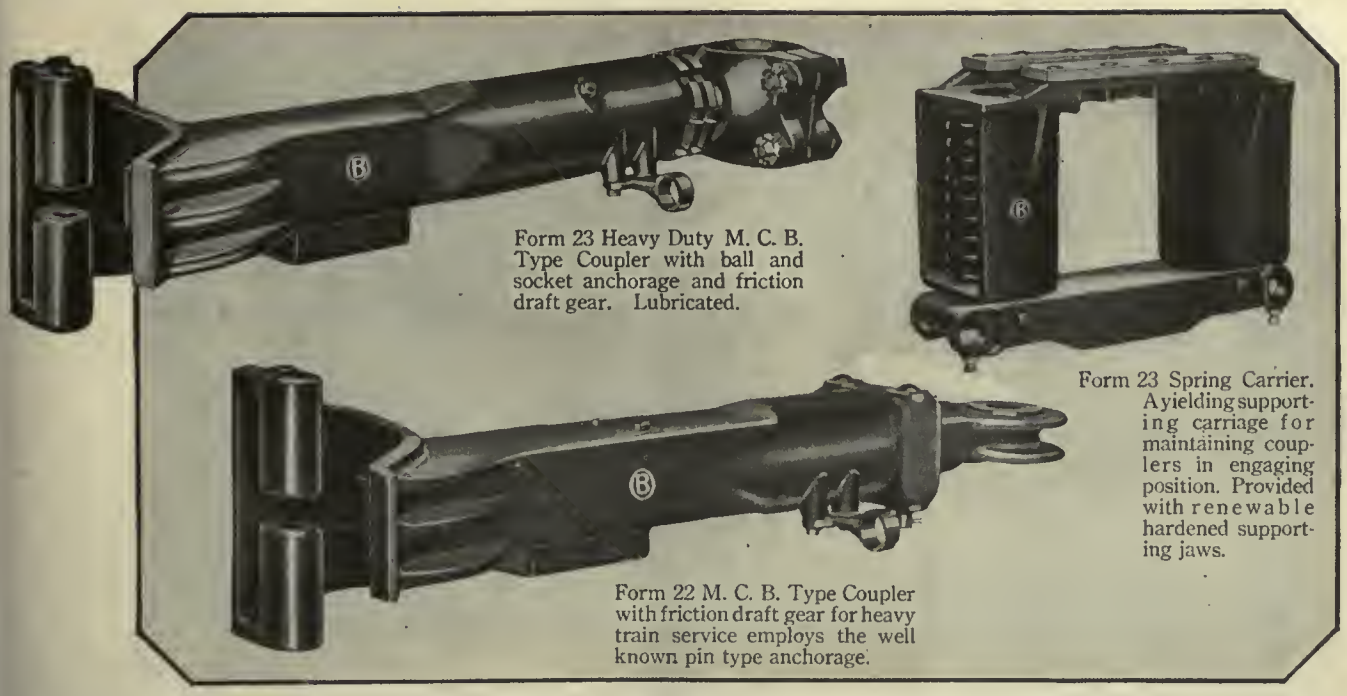
1. **Less journal box wear.**
2. **Permits wheel to follow freely, vertical inequalities in track.**
3. **Makes use of flanged brake shoes practical.**
4. **Higher co-efficient of friction.**
5. **Divides energy absorption between two shoes, thus reducing heating effect from brake application.**
6. **Reduces frequency of brake shoe replacements on the car.**

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Form 23 Spring Carrier. A yielding supporting carriage for maintaining couplers in engaging position. Provided with renewable hardened supporting jaws.

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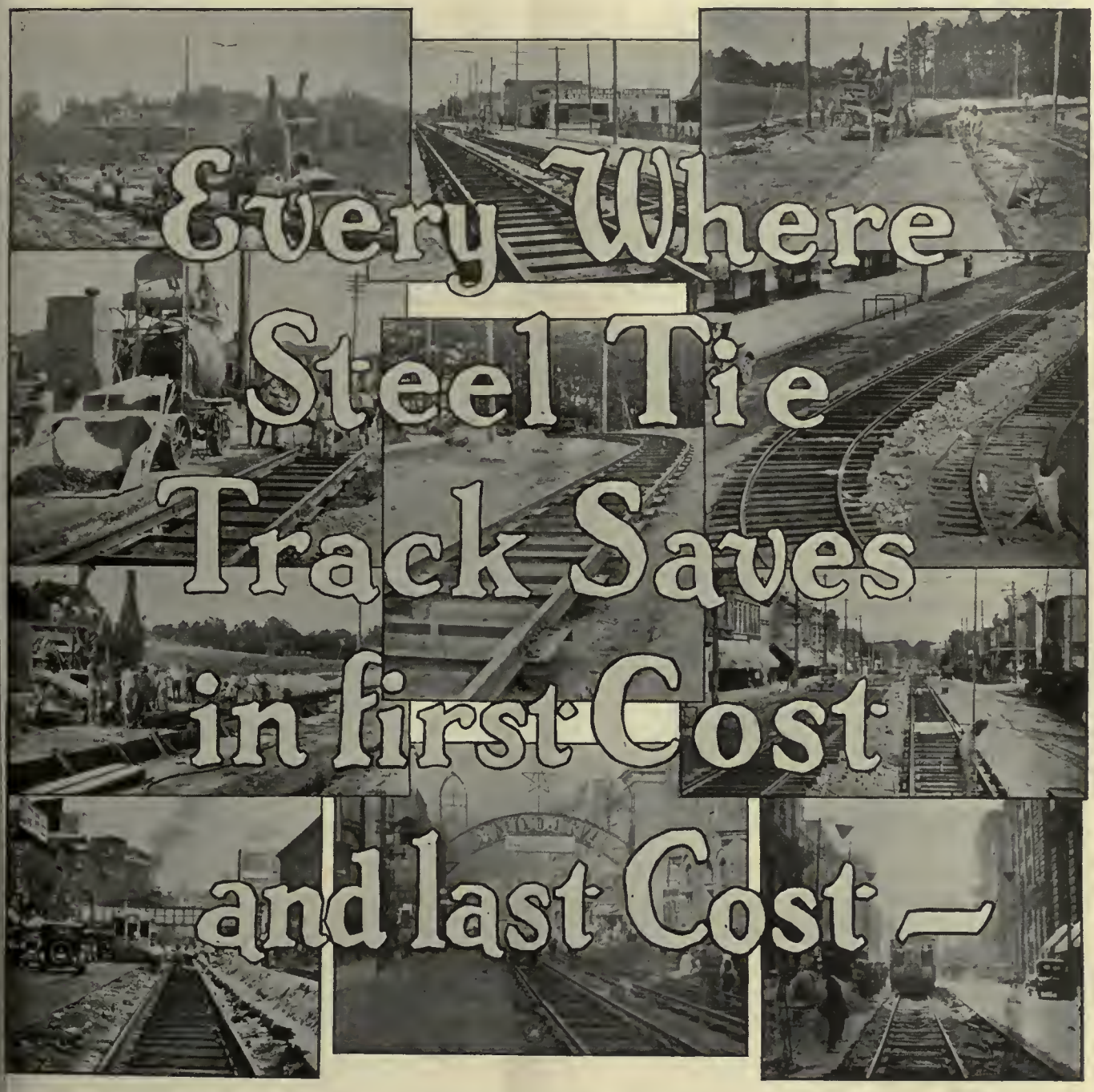
Three car train on the Pacific Electric Railway equipped with Westinghouse "K-1-A" Tight Lock Couplers.

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Keystone-Ivanhoe Fixtures are designed to meet the requirements of all types of buses. These fixtures are now used on better buses everywhere.



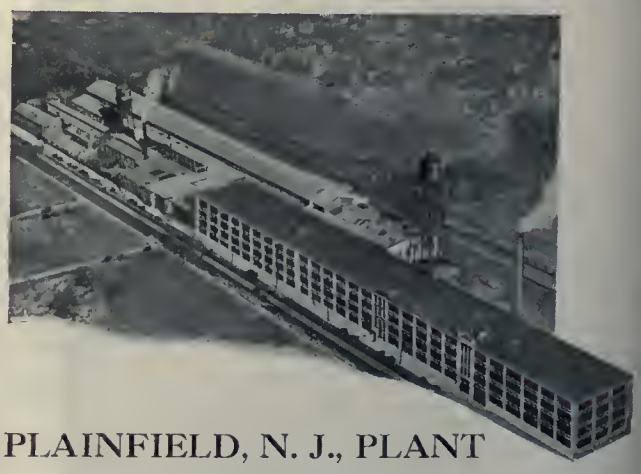
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"As for your special methods of grinding gears by a true generating process, accurately grinding them to form and pitch, no wonder the Mack transmission is silent.

"I am struck particularly with the way you inspect each part through every step of its manufacture and the close tolerances to which you work. And as for that stockroom, several million dollars worth of parts, including those for obsolete models, assures *some service!*"

Mack invites you to go over the same ground and visit this New Brunswick plant, as well as those at Plainfield, N. J., and Allentown, Pa. If you cannot do so the next best thing is to go to the direct Mack factory branch nearest you and inspect the finished product.

MACK TRUCKS, INC.
INTERNATIONAL MOTOR COMPANY
25 Broadway, New York City

More than one hundred direct MACK factory branches operate under the titles of: "MACK MOTOR TRUCK COMPANY," "MACK-INTERNATIONAL MOTOR TRUCK CORPORATION," and "MACK TRUCKS OF CANADA, LTD."

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For suburban and lightweight interurban cars where an inexpensive but well designed comfortable seat is needed. Plush upholstered spring edge cushion and detachable back.



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One of the many Hale-Kilburn seats especially designed for bus service. This 208 De Luxe Type has divided back, spring cushions and air cushion pads. Leather or imitation upholstery as specified.



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National Pneumatic Devices serve as satisfactorily on heavy traction lines as on any other type of railway property. They are in service, for instance, on the Interborough Subway System — the world's most severe testing ground for all kinds of equipment—where they have proved dependable in all respects.

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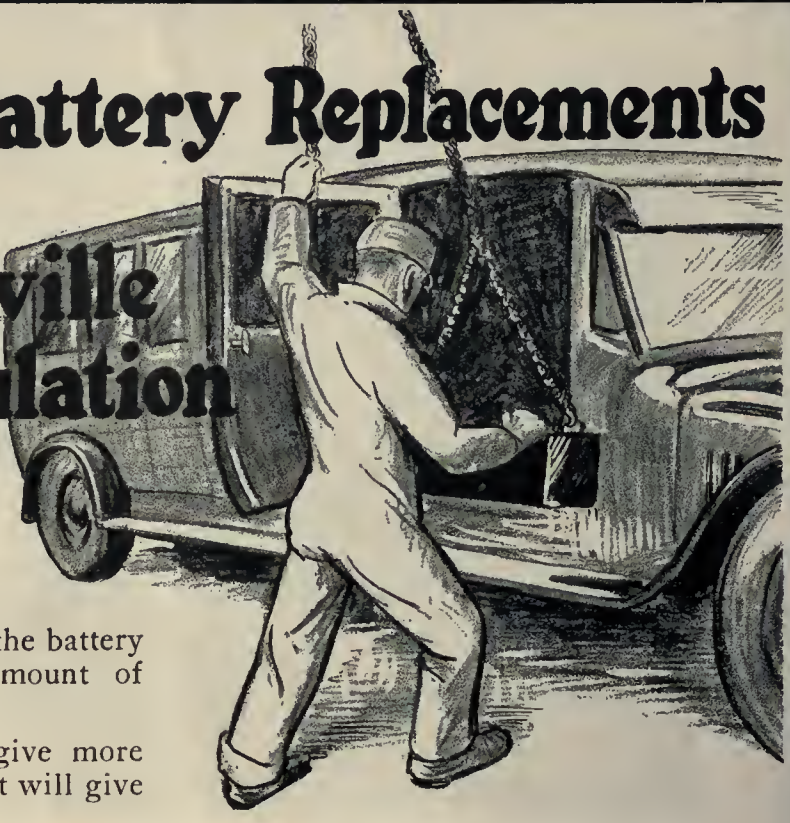
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Cut Down Battery Replacements with Leece-Neville Voltage Regulation



The maker builds into the battery you buy a certain amount of service.

Well treated, it will give more service—badly treated it will give less.

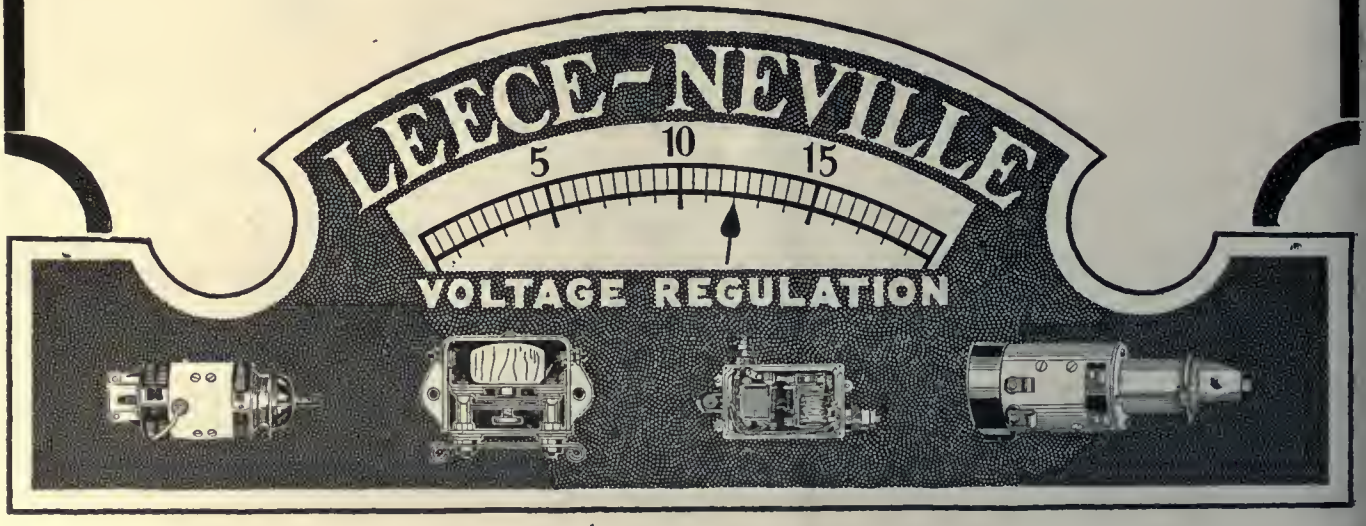
Leece-Neville Voltage Regulation by insuring charging at correct rate—by preventing overcharge—so extends the life of the battery you will find the installation very profitable for that reason alone.

In addition all electrical equipment is protected against damage, lamp replacements are decreased, lights will run from the generator without flicker even when the battery is not in circuit. The battery is always ready—always in condition to start the motor.

A note will bring a booklet—also information as to nearest Leece-Neville Service Station, where voltage regulation will be fully explained. Specify it when *ordering buses.*

The Leece-Neville Co.

Cleveland, Ohio



The Phono Record

1865 A bulletin of Phono-Electric Achievement 1926



Rochester Lines expect to install Phono at all heavy traffic points

Approval of Service Rendered Based on 19 Years' Experience

Roosevelt's Administration at the height of its "cleaner business" activities. The electric trolley car in the full swing of development. The photographic industry as yet an infant.

Such were the "signs of the times" when the first stretch of Phono-Electric went up in Rochester.

But Rochester is now a growing industrial city and the largest producer of photographic materials in the World. Its electric railway lines carry increasingly heavy traffic. Phono's proven ability to outwear hard drawn copper two to three times, its freedom from "breaks" and its economy, have made it Rochester's accepted and logical specification "for all heavy traffic points."

Such has been the result of 19 years' experience with Phono-Electric in very typical city and suburban service.

Yet it is but a duplication of similarly attested performance records made under widely varying conditions and in many parts of the world—actual evidence of better trolley wire service that is influencing trolley wire specifications on every progressive road.



Phono totals 32% of present trolley

Slightly Lower Conductivity Not Considered Important

With 32% of its entire trolley mileage Phono-Electric, Rochester should be able to express an authoritative opinion on the subject of long life.

And to our question,—"Do you regard the lower conductivity of Phono as a serious consideration *when offset by its longer useful life?*"—Rochester has replied emphatically NO. Rochester's trolley conditions are normal, with a good feeder system, and average current loads. For installations where conditions make conductivity a vital point we recommend Phono Hi-Con.

Phono Hi-Con now on market

60% or 80% Conductivity Available When Needed

To meet conditions where conductivity of the trolley wire is of great importance, as on lines in outlying districts, or where the feeder system relies on the trolley to carry part of the current load, Phono Hi-Con is now offered to the electric railway industry. In composition it is similar to Phono-Electric except that the copper content is higher and the wear necessarily a little less.

Phono Hi-Con with Conductivity of 60% to 80% can be supplied. Details on request.

"Bridgeport" BRASS TRADE CO. MARK
Phono-Electric

What Phono-Electric will stand in a fire, what it will stand under heavy fatigue strains, how its remaining life may be determined at any time during service and many other useful facts are illustrated and tabulated in a recently issued bulletin published by Bridgeport Brass Company.

TIMKEN



Have you received your copy?

This interesting book, "Motor Coach Operation and Maintenance," discusses: (1) Organization of a Motor Coach Company; (2) Selecting and Training the Operating Personnel; (3) Duties and Responsibility of Employees; (4) Schedules; (5) Maintenance—The General Overhaul; (6) Maintenance—The Annual Overhaul.

We will gladly mail a copy to any interested operator at his request.

THE TIMKEN-DETROIT AXLE CO., DETROIT, MICH.

AXLES



Motorcoach Operators Told Their Needs— Experienced Engineers Produced the Tire

MOTORCOACH and bus operators who came in touch with United States Tire experts as they were studying actual operating conditions throughout the country, know the thoroughness with which these investigations were conducted.

It is small wonder then, that the United States Royal Cord Motorcoach Tire is the exact answer to the expressed needs of bus and motorcoach operators everywhere.

It is a credit to the skill of the United States Tire engineers who designed it. Their experience covers the development of the bus tire from its beginning, for they produced the *first* pneumatic bus tire.

And what is of greatest importance, they had available every resource of the world's largest growers and manufacturers of rubber.

Latex-treated Web Cord contruction, providing maximum strength and maximum flexibility.

Sprayed Rubber, setting a new high standard of purity and uniformity in rubber.

Specially designed tread that not only gives excellent traction and braking but has sufficient flexibility to adapt itself to varying load conditions. Wear is slow and uniform.

Rigid tests have shown that the Royal Cord Motorcoach tire will give the lowest possible cost per tire mile.

The name Motorcoach is on the side wall to indicate its *specific* use.

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UNITED STATES
ROYAL CORD
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To obtain renewal parts that fit; to obtain exact duplicates of the originals, in quality and workmanship; to be certain of a life equal to that of the originals, order from the equipment manufacturer.

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S4C-31

GENERAL ELECTRIC

Electric Railway Journal

Consolidation of Street Railway Journal and Electric Railway Review

Published by McGraw-Hill Publishing Company, Inc.

CHARLES GORDON, *Editor*

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Leading the Way to Transit Improvement

ONLY within comparatively recent years has the need for city planning taken root and made progress. Until the combination of the modern skyscraper and the automobile brought matters to a climax, American cities, like Topsy, "just grew up." Present-day congestion results from the lack of early planning and inability to foresee the extent of the growth in demand for street space.

Public opinion has failed to keep pace with rapidly changing conditions. The individual property owner has been allowed the utmost freedom in the improvement of his holdings without regard to the cumulative effect on the community as a whole. City plans and zoning laws restrict the rights of the individual within the limits required by the community. But their ultimate effect is to the advantage of the individual.

Since city property value is created by the growth of the community, wise zoning measures designed to bring about orderly development and community stability react to the ultimate advantage of the individual. Nevertheless, zoning laws and city plans encounter a stiff resistance due to the inertia of the public mind in adjusting itself to the increasing importance of collective action brought about by growing congestion. In some communities such regulations as have been adopted are mere expedients to give some measure of immediate relief. Only recently has there been any tendency to get down to fundamentals.

Probably the most neglected and at the same time most important factor in modern city development is common carrier transportation. Failure to give transportation adequate consideration results in such facilities lagging behind the needs of the community. Even today, comparatively little progress has been made in considering transportation as a whole in its relation to city growth. There is increasing need to plan adequately for the development of future facilities on a scale which will enable each step in new construction to be made as part of a co-ordinated system. Progress demands that transportation be recognized as a constantly changing and developing art. The growth of the city itself brings new conditions and new requirements. This has been complicated by legislative attempts to fix for long periods of years conditions of operation that vary from day to day in accordance with economic and social changes. Community transportation has been treated as a fixed rather than a developing art. Consequently such progress as has been made is best described as a series of stumbles.

There is considerable encouragement in the growing approval of the terminable permit form of franchise. This arrangement eliminates the recurring periods of retarded development that are brought about by approaching expiration of fixed term grants and at the same time makes it possible to keep the transportation system of a city attuned to changing conditions and requirements.

Surely the time is ripe for a broader and more fundamental approach to the local transportation situation. Along with the transportation of passengers between their homes and places of business comes the demand for preferred service in buses or taxicabs by those willing to pay the higher cost. The use of streets by trucks and other vehicles for the transportation of goods and commodities must also be taken into account All of these agencies must receive consideration in a broad city plan.

Existing transportation executives with a direct interest in the solution of this vital community problem are the logical leaders of thought on the subject. But the degree of success accomplished will depend on the extent to which they identify themselves in the public mind with the interest of the community as a whole rather than that of a particular agency.

Chamber of Commerce Induces New Level of Thinking

SELF-GOVERNMENT in American business was the outstanding theme at the fourteenth annual meeting of the Chamber of Commerce of the United States, held in Washington last week. Of particular importance was the viewpoint of Secretary Hoover, reiterated by several other speakers, that we are gradually adjusting the nation's industrial system to the instincts of industrial freedom and equality of opportunity. We are also setting up a new relationship in industry which departs widely from that of the old world. This new conception of capital and labor point to a mutual understanding of the problem. As a result, labor-saving devices and better administration are reducing labor costs per unit of production below even those of cheaper labor abroad.

In the transportation field the result of this attitude can be seen in the widespread adoption of the one-man car and the greater productivity of labor in all departments. It is this co-operation which has been essential in keeping up the quality of service while rates have been held down.

Combined with this, a notable growth of a higher sense of co-operation in the whole community was remarked on by Mr. Hoover. Association activities, such as chambers of commerce and trade associations, were commended for the great part they have played in producing a more efficient, more ethical business practice and a better synchronizing of the parts of the economic machine. In no industry has this co-operation been more valuable than in transportation, for its success depends entirely on the service rendered and the recognition of the value of that service by the community.

No one could attend the sessions of this great body without realizing the force the Chamber of Commerce

has in the community today. Particularly should transportation men realize that they can well lend their support to their local commercial organizations. Both in the local sessions and in the annual meetings there has been introduced a new level of thinking and of business and industrial practice that is having its influence in all parts of the land.

His Formula Works in Practice

SAMUEL INSULL talked frankly about the electric railway situation at the Advisory Council conference in Chicago on Feb. 24. His general theme was merchandising. His formula is an old one to successful sales organizations: "Know your goods, sell yourself; then go after the customer."

That this formula works in the utility business is strikingly portrayed by the record of the properties which Mr. Insull heads. The record speaks for itself, but it is further emphasized by the fact that the National Electric Light Association at its convention this week again awarded the Coffin prize to an Insull property, the Commonwealth Edison Company of Chicago.

Electric railway operation today encounters problems peculiar to itself. But one thing of direct interest stands out in the record on which this latest award was made. Mr. Insull's formula works. In Chicago, 94 per cent of all homes use electricity. That record is the result of merchandising. A good sales job has been done there. The record of his electric railway properties likewise shows that the same formula works in the transportation business.

Public Transportation an Essential Industry

WERE additional evidence needed of the essential character of public transportation it would be found in the report recently made to the Traffic Survey Commission of Baltimore by Kelker, De Leuw & Company, a portion of which is abstracted in this issue. Many counts were made of the relative use of various transportation means. It was found that out of a total of 79,831 persons employed in the downtown district 64,664, or 81 per cent, use the public facilities offered them for transportation. Those using automobiles and taxicabs were only 8.5 per cent of the total, while the remaining 10.5 per cent walked. And this was in a city which the engineers state is more than usually compact.

Similar counts of workers in the principal industrial districts somewhat outside the congested zone show that while a far greater proportion of the workers walked, or 36.7 per cent of the total, only 7.3 per cent depended on private automobiles. This is the more surprising in that it is frequently assumed that the automobile is used to a greater extent in those localities where the space limitations for parking are less severe.

Another interesting count shows that the average airline distance of the residences of the street-car riders from their work is 2.52 miles, the steam and interurban railroad patrons 3.20 miles and the users of passenger automobiles 3.30 miles. This would indicate that as the distance to be covered becomes greater the advantage of taking a direct ride in one's own car becomes relatively more.

These observations go to show that there is room for more study on the reasons why some automobile owners prefer to use their own cars. With the reasons ascertained, it should be possible to plan public tranportation that will appeal directly to this class. For, small as it is, compared with those who use the rail and bus lines, it is the cause of a major portion of the congestion that is choking the streets of the cities. This was seen from the cordon count, which showed that 60 per cent of the total number of vehicles entering and leaving the central business district were passenger automobiles. Therefore anything that can be done to attract the automobile riders to public transportation lines will make a favorable showing in the relief it will bring to traffic congestion.

$1,000,000,000 Traction Investment Subject to These Men's Judgment

NEW YORK has a new deal in regulation. Tammany and its cohorts have had their way. It was all a matter of attrition. Inch by inch the Republicans gave ground. Finally, they capitulated. To cover the happenings between the first attempt completely to Tammanyize New York City and the recent culmination in the appointment of the new Transit Commission by Governor Smith would be to write much recent political history. That is not necessary here. Forget the measures and examine the men! Governor Smith, self-pronounced friend of municipal ownership, has made a good record in office. The fact remains, however, that he is in a position to direct the transit policy of New York City. The Board of Transportation, although appointed by former Mayor Hylan, is controlled by two of the Governor's life-long friends. Now, by his appointment of three new members of the Transit Commission, that body has come under Democratic domination.

It is the principle, however, more than the politics, that is of interest. True, under the former arrangement of divided responsibility, with the Transit Commission on one side and the City Board of Transportation and the Board of Estimate on the other at loggerheads, there was no chance to get anywhere. Particularly during the administration of Mayor Hylan did a condition of open warfare exist. Since the first of this year under Mayor Walker the olive branch has been much in evidence, but time did not permit it to be ascertained whether this was merely a gesture. Just before the members of the old Transit Commission were decorated with the lily of oblivion by the Legislature the commission voted two to one as a fitting Parthian shot to require the Interborough to spend $22,000,000 for new construction and new cars. And then the members feelingly added as an afterthought that, perhaps, the city could be induced to stand part of the cost. So passed out of the picture the men Hylan characterized as "tools" of the "traction crowd." Certainly the words never did fit the action of the old commission, but that meant nothing to Hylan.

Anyway, the Democrats are in the ascendant and their voices are being heard. The first is that of Transportation Commissioner Delaney. He tells City Comptroller Berry, an independent, that $100,000,000 must be found at once or work will soon have to stop on the new system of subways intended for city operation. And Mr. Berry says the city's borrowing power has been exhausted and that if Mr. Delaney is to have his $100,000,000 the amount will have to go into the tax budget. At which the taxpayer groans, for while

it is true the tax rate has not gone up much in the last six or seven years, many property assessments have doubled in that time.

Meanwhile the Board of Estimate has before it the myriad of bus proposals. Under the former alignment of forces the Transit Commission was confidently expected to offer a series of checks and counters to any action by the Board of Estimate in granting rights that might be prejudicial to the interests of the existing carriers. In this respect the old board, no matter what other criticisms might be directed against it, set a high standard. Whether the new board will measure up to its responsibilities remains to be seen. More than $1,000,000,000 is invested in the local traction systems, of which more than $350,000,000 represents funds of the city of New York. Many of the bonds of these companies are selling at receivership prices. Harmony of action is promised among the Board of Estimate, the Transit Commission and the Board of Transportation, but harmony of action alone will not settle properly the problems now up for consideration. Back of all the political jockeying is a significant change from the fundamentals which were in mind when the commission control was ushered in during the Hughes régime in 1907. It would be interesting if some student of politics and economics would dedicate himself to the task of tracing the history of all the changes—changes that amount to home rule, with the exercise of authority finally resting in one political party, with the prospect that it will continue to rest there.

If a Little Is Bad, a Good Deal Is Worse

CURIOUS notions of economy seem to prevail among the municipal authorities in New York City. It has been decided that the present synchronized traffic lights on the principal north and south avenues of Manhattan shall be electrically connected so that all can be controlled from a single point. Similar arrangements are proposed for the other boroughs. As a result of this interlocking it is expected that many policemen now on traffic duty on these avenues will be released for other work and that the city will thereby save some $200,000 a year.

Even the most optimistic of the city officials can hardly expect any other outcome than a reduction in vehicular speed, and hence a smaller traffic capacity on the streets thus controlled. That has been the result in New York and elsewhere on individual streets equipped with synchronized signals. When such a system has been extended to more than one street the consequent delay to traffic movement has been even more pronounced. A borough-wide system would appear to be the height of inefficiency. The police commissioner himself is said to believe that the synchronized signals will have to be ignored at a number of the more important intersections. Certainly that looks like an admission beforehand that the proposed system will not be very satisfactory.

Engineers state that the present congestion in New York costs above $500,000 a day. Millions are being spent to widen streets to increase their capacity. Yet the city proposes deliberately to reduce the capacity of existing streets in order to save $200,000 a year. It is just this kind of thoughtless procedure that has helped produce the present deplorable traffic situation. Instead of making a careful study of the problem, as was done in Chicago with the co-operation of the Surface Lines officials, and working out a scientific solution, New York seems to think the disease can be cured by larger doses of a remedy which heretofore has served only to make matters worse.

Transportation Men Must Watch City Zoning

MEN in the transportation field have always followed the development of city planning with considerable interest. Naturally their greatest concern has been in the street layout and in provisions for handling street traffic. However, zoning restrictions covering height, area and use have not been watched so closely.

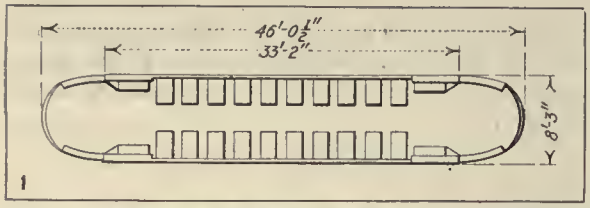
Ten years ago a city with a zoning ordinance was worthy of comment. Last year the United States Department of Commerce stated that there were 26,000,000 people living in zoned cities, towns and villages, or more than half of the total urban population. This development is extremely recent; more than 55 per cent of it was made during the previous four years.

Zoning is just beginning to be a powerful factor in controlling the method of a city's growth. It is getting to be a necessity, like an adequate water supply or a sewer system. No street railway man would stand by without a protest and see a sewer put in where it would weaken the roadway of a principal artery so that he could not run electric cars or buses over it. Neither should he stand by and see a slower but nevertheless a real loss of value in his plant because of some ill-advised zoning. He can be a positive factor in the matter, not for the benefit of his plant alone, but because of pride in his community; for zoning cannot be permanently successful unless the requirements for good transportation are met in the right way.

Unknown Opportunities in an Unheralded Work

BEHIND the lines in the operation of a railway occasions arise for the astute employee to advance his own interests and to increase the company's assets in good will. In the lost and found department is there just such an opportunity, for while the public retains its faculty for losing, railway managements will continue to supply facilities for finding and the employee will be enriched by his experiences as a medium of restitution. Forgetfulness is a human failing. Even from across the ocean reports emanate that our English cousins left many invaluable possessions on the cars in 1925. Over there, too, the lost article office of the railway is a veritable dry goods house-zoo-hospital-university combined.

Both intellectual and emotional stimulation are afforded the chief clerk of such a repository in peering into the innermost recesses of a vanity case, or clutching a set of teeth—still glistening—and in caring for a cat which became three while awaiting a claimant, However, the work of that department is not just a succession of glamorous experiences for the overseer's mental and spiritual education. Indirectly, the man engaged in this work is enriched by seemingly commonplace incidents. His development, though certain, is incidental. His real rôle is representative of the company. In this capacity, when answering unreasonable telephone inquiries and reassuring agitated patrons, he has the chance to show patience, understanding and sympathy.

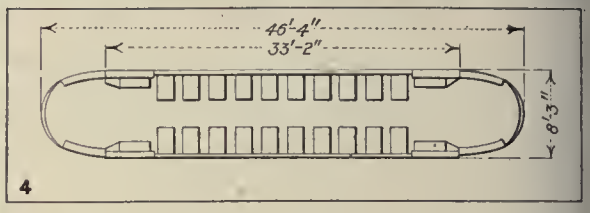


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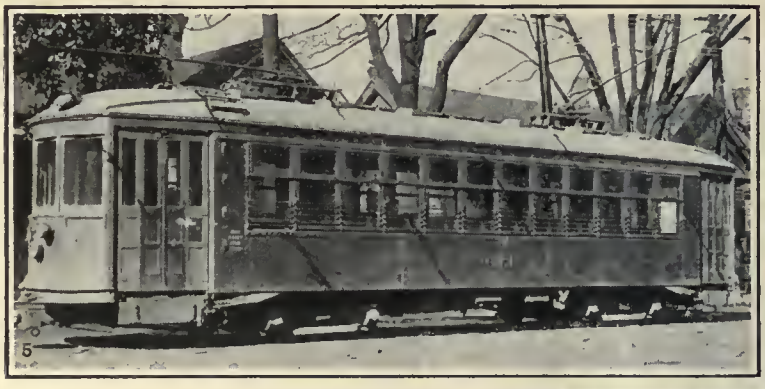


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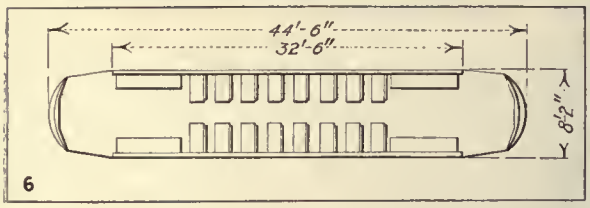


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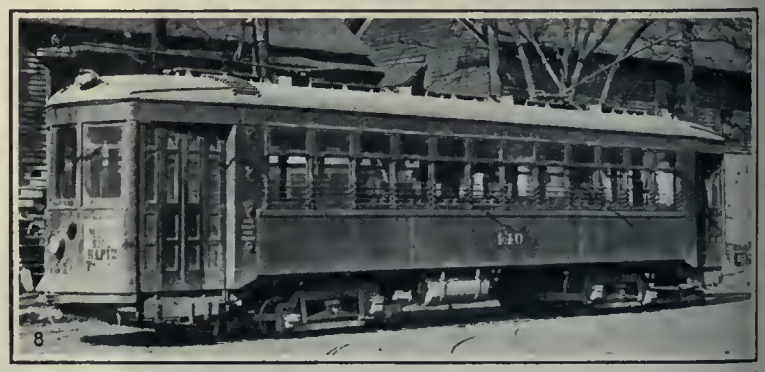
Modern Cars Replace Old Types in Atlanta


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THE cars used in Atlanta up to 1922 included almost everything, from a 28-seat single-truck car to double-truck cars of 60-seat capacity. The weights of these cars varied from 19,400 lb. to 46,500 lb. Some of the older types are shown in Figs. 7, 8 and 9.

The purchase of modern cars began in 1922, and the 40 cars acquired between that year and 1924 are represented by the "600" type (Figs. 5 and 6). Twenty of these cars were built by the McGuire-Cummings Company and twenty in the company's shops. Both lots were of the same size; that is to say, they had a capacity for 48 seated passengers, weighed about 37,000 lb. each and were equipped with double trucks, with 26-in. wheels and four GE-265 motors. Early in 1925 twenty cars of the "800" type (Figs. 1 and 2) were received from the Cincinnati Car Company. Although of the same seating capacity as the "600" type, they differ quite materially from the latter, both in outside appearance and in seating arrangement, as shown in the illustrations. Full particulars of these cars were published in the issue of this paper for May 2, 1925, page 695.

All of the cars added up to this time to the Atlanta system were designed for operation with two men. Later in 1925 forty cars were purchased very similar in outside appearance and seating arrangement to the "800" type, except that they were fitted with pneumatically operated doors and steps, with treadle for the rear door operation, so that they could be operated with one man. These cars (shown in Figs. 3 and 4) are known as type "900." In March, 1926, the company placed orders for 60 more city cars of the "900" type. A summary of the specifications of these cars accompanies this article.

About the same time or shortly before, the company also placed orders for ten single-end, one-man interurban cars. Further particulars of these cars are given in the accompanying article.

New Cars More than Pay Their Way

The Atlanta Management Believes in Modern Rolling Stock and Started on Its Campaign of Replacing Old Cars with New in 1922—One Hundred and Twenty New City Cars, About One-Third of the Total Number, Have Been Ordered During 1925 and 1926—New Cars for Interurban Lines Also

LARGELY through the addition of improved rolling stock and the scientific selection of the types of car to use, better public relations have been established in Atlanta and better financial conditions exist on the property of the Georgia Railway & Power Company. This was pointed out in an article in this paper for May 8.

The purchase of modern low-level four-motor cars for city service in Atlanta began in 1922, when the company purchased twenty cars of what is known as the "600" type. In 1923 twenty more cars of this type were built in the shops of the company, and in 1924 still twenty more cars of this type were ordered. These cars were received in 1925. Later the same year twenty cars of the "800" type were put in service, and still later in the year 40 "900" type cars were added. The accompanying engravings illustrate all of these types of cars and some of the earlier models.

The 40 cars of the "900" series, put in operation late in 1925, were the first designed for one-man operation to be used in Atlanta. Before their arrival some people were skeptical of their advisability because of the race problem, but a thorough trial has demonstrated the service by these cars to be a success. The fact that there are both front and rear exits helps the situation mentioned. The cars are painted green and cream, colors different from those of the other cars, and they are very attractive in appearance.

Before the last order for 60 cars was placed in March of this year the company made an exhaustive study of the type of car and equipment best suited to its conditions, including seating capacity, arrangement of seats, type of seats, etc. These studies took into consideration cars of a seating capacity of 32 up to 52.

The method followed was to make traffic counts for each line during different periods of the day, and sufficient counts were taken so that the average distribution for each line was determined. Obviously, however, the choice of equipment was not made on the conditions shown directly on these curves, because after their purchase the cars would have to run for ten years or more, so that conditions five years hence were taken as the average which they would meet. Hence, the curves were expanded and otherwise modified to represent traffic conditions expected in 1931.

On the traffic charts thus compiled the transportation engineers of the company plotted the cost of giving efficient service with cars of different seating capacities. The result of this study soon showed that the choice lay between a 40-seat and a 48-seat car. In the more detailed study then made of the relative merits of these two types consideration was given to the saving in energy from the operation of the 40-seat car, whose weight was taken at 32,000 lb., the gain which should be expected from the shorter headway with the shorter car, etc., against the higher platform cost per seat,

Extracts from Specifications for Last Order for Cars—Atlanta

The following extracts are taken from specifications covering 60 cars ordered by the Georgia Railway & Power Company in March, 1926

GENERAL DIMENSIONS

Length over dashers	45 ft. 4 in.
Length over body	33 ft. 1 in.
Length of platform	6 ft. 1 in.
Height, rail to top trolley boards	11 ft. 2 7/8 in.
Height, rail to first step	15½ in.
Height, step to platform	14½ in.
Ramp in car floor	3½ in.
Post centers	29½ in.
Clear height inside	7 ft. 11⅝ in.
Width over eaves	8 ft. 3⅝ in.

GENERAL INFORMATION

Seating capacity	48
Width of seats	34 in.
Width of aisle	27 in.
Width of front-entrance door	50 in.
Width of rear-exit door	32½ in.
Truck centers	20 ft. 6 in.
Wheelbase	5 ft. 4 in.
Size of wheels	26 in.

Roof—Car body roof will be of the monitor type.

Doors—All doors will be sliding, operated by National Pneumatic Company's door engine. Rear door will be treadle-operated and provision will be made so that street collector can open this door from the outside with a key.

Curtains will be installed at all body windows, and there will be operator's vestibule curtains; material, pantasote.

Heaters—Each car will be equipped with twelve panel type electric heaters made by the Consolidated Car Heating Company and equipped with thermostatic control.

Seats—Each car will be equipped with twenty Hale-Kilburn No. 400 reversible cross seats, 36 in. over all. Seats will be framed of wood and fitted with springless canvas-lined rattan panels in cushions and backs. Four longitudinal seats with same cushions and backs will be provided. One folding operator's seat with wood top on each platform.

Hand Brakes—The National Brake Company's Peacock stafless brake gear, ratio 12/52 with 20-in. iron brake wheel, will be installed in each vestibule.

Fenders—Each end of car body will be equipped with one "Atlanta" type drop basket life guard.

Mirrors—The cars will be equipped with mirrors to give the operator a full view of the interior of the car.

Trucks—Car body will be mounted on Brill 177-E-1 trucks with Stucki side bearings. Brake pins 1⅜ in. in diameter.

Electric Equipment — Four General Electric Company's 265-A, 35-hp. motors with K-35-JJ controllers and line breaker for double-end operation.

Gears — Thirty cars to be equipped with General Electric Company's No. A-1 combination tempered and case-hardened long and short addendum tooth type.

Lightning Arresters—Aluminum cell lightning arresters to be installed on the platform No. 1 end.

Air Brakes—Westinghouse Air Brake Company's double-end, straight air brake equipment with all emergency and safety features, including DH-14 air compressor, 8 in. x 12 in. brake cylinder, Westinghouse R-4 type governor, M-28 brake valve, two 14 in. x 42 in. enamel air reservoirs, American Brake Company's type E-1 slack adjuster.

Safety Equipment—Full double-end safety car equipment as furnished by the Safety Car Devices Company.

increased traffic congestion, street accidents and other disadvantages accompanying the use of the small cars as compared with the large ones to provide the same number of seat-miles.

In this detailed comparison it was found that on the twelve more important routes the 48-seat car was the more desirable, but on the twelve other routes, with less traffic, the smaller and lighter car with a seating capacity of about 40 would be more economical. The decision was finally made to place the order for the 60 cars, all to be of the 48-seat type, so as to equip the more important lines first.

The car color decided upon was similar to the olive green color used on the other cars, except that, as stated, all safety cars have a cream trim, which makes them easily distinguishable from the two-man cars. A summary of the specifications for the new cars accompanies this article. The new cars ordered are said to be the first in this country to be built completely under the rules adopted late in 1925 by the National Board of Fire Underwriters. Owing to the fact that they are being built entirely in accordance with the national requirements, an annual saving in premiums of $7.25 per car was secured.

Operating Gains from Improved Rolling Stock

As explained, the company has been operating modern types of cars (though mostly two-man cars) since 1923, so is in a good position to report on the benefits gained from their use. Those resulting from more attractive and more easily accessible rolling stock are rather hard to evaluate in dollars and cents, but the savings connected with the maintenance, larger capacity, increased speed and reduced accidents are susceptible of much more definite determination.

Table I gives a comparison of maintenance expenses in cents per car-mile, as determined by the records of the company. The new cars are those of the four-motor type or "600," "800" and "900." The "old cars" taken for comparison in this table are those of the same capacity as the new cars but purchased prior to 1922. The "600," "800" and "900" type cars, as previously explained, are very nearly alike in dimensions, capacity and electrical equipment, the chief difference being that the "900" cars are one-man cars and equipped with all safety features. The gain of the new cars in the cost of power and in maintenance of equipment and way and structures is due principally to their lighter weight. The saving in conducting transportation is due to their ability to maintain faster schedules.

TABLE I—SHOWING COMPARATIVE OPERATING EXPENSES IN CENTS PER CAR-MILE

	New Cars	Old Cars
Maintenance of equipment	2.18	2.49
Maintenance of way and structures	2.13	2.44
Power	5.03	5.74
Conducting transportation	13.39	14.05

The company estimates that with these savings and those due to larger capacity, increased speed and reduced accidents, the gain from the operation of the 60 new one-man cars ordered will be $210,142. This gain is based on a comparison of the costs of operating the new one-man cars and the old two-man cars which will be retired. The cars to be retired will be partly double-truck and partly single-truck cars.

On the routes where the new cars replace double-truck cars the saving will result from lighter weight, some increase in speed and the use of one man instead of two. Where they replace single-truck cars of 28 seats capacity fewer car-miles will be required because of the larger capacity of the cars. The aggregate of all of these savings is the sum mentioned.

Incidentally during the last five years, it might be said, the company has increased the scheduled speed on its city lines from 9.18 m.p.h. in 1920 to 9.79 m.p.h. at. present. This gain is despite a slowing down of about 1 mile an hour in the business district following the introduction of traffic signals. The increased speed is attributed largely to better acceleration and braking through four-motor equipments and improved brakes.

Situation on the Interurban Lines

Owing to the long distances between large cities in the Southern states there has not been the same development of interurban lines in that section of the country as in the North. The Georgia Railway & Power Company, however, has two high-speed lines, built for the greater part of the distance over its own private right-of-way, reaching suburban towns about 18 miles in each case from the center of Atlanta.

The service given on these lines is similar to that on the interurban lines in the Central states and the cars are run on about 1-hour headway. One line is known as the Atlanta Northern and reaches Marietta. The other is known as the Stone Mountain line and passes through Decatur en route.

The five new cars for the Atlanta Northern Railway are 52 ft. in length, with a smoking compartment and individual cushion seats. A new departure will be made by naming each car, like the sleepers and chair cars in Pullman service. The names given will be those of people who have been distinguished in the history of Georgia but are not now living. These names will be put on in gold letters on a red background. The remaining finish of the cars will be quite striking, as flamingo will be used as high as the water table and cream to the letterboard. The roof will be yellow.

These interurban cars will be equipped with multiple-unit control so that two-car trains can be operated, and there is a conductor's door at the end so that one conductor can collect fares in both cars. They were purchased from the Cincinnati Car Company and were to be delivered in May. Five similar cars have been purchased for the Stone Mountain line, to be delivered in June.

At present the Atlanta Northern line is being operated by two types of cars. One is the type "300" car bought in 1905 and weighing 67,000 lb. There are five of these cars and they will be scrapped when the new cars arrive. There are also four large cars purchased in 1921, each with four 100-hp. motors. These will be used as motor cars with a trailer to make a two-car train, the cars being permanently connected for traffic. That is to say, they are not disconnected except when one of the cars has to be sent to the shop. These trains will be used during the rush hours and the new light cars for the basic schedule.

On the Stone Mountain line the present equipment of six cars, which are more modern, will be retained, except that four of the cars will be connected up to make multiple-unit trains, and the five new cars ordered will be used on the basic schedule.

Before the order for the light-weight interurban cars was placed for the Atlanta Northern the company made

an extended study of their possibilities from a financial standpoint very similar to that conducted for the city cars, and before ordering new cars determined that operating economies of $27,383 a year were possible. This figure was based on the cost for the five cars and accompanying equipment of $123,750 and annual charges for interest and depreciation of $13,200. This left a net saving of $14,183 on the investment. The total cost as given includes changes in tracks, carhouses, etc., as well as the cost of cars, and the net saving was based on a proposed operating schedule which will provide more cars than at present. The annual platform expenses for the light-weight car were taken as $22,141 and for the present equipment as $32,193.

Some of this saving in lower platform cost is due to the smaller number of employees required per car from one-man operation on single cars and two-man operation on two-car trains and part is due to saving in dead mileage from storage of cars in Marietta. The figures of the proposed operations, it should be stated, include some use of the older equipment during rush hours, as already explained.

It is estimated that the increased revenue from the improved service will amount to about $20,000 a year.

Table II gives estimated figures for maintenance and power for the new equipment selected and for the present equipment. The figures relate to the Atlanta Northern Railway.

TABLE II — ESTIMATED COSTS IN CENTS PER CAR-MILE FOR MAINTENANCE AND POWER, ATLANTA NORTHERN RAILWAY

	With New Cars	Present Equipment
Maintenance, way and structures, motor car	2.095	3.300
Maintenance, way and structures, trail car	.....	1.170
Maintenance, equipment, motor car	1.500	2.193
Maintenance, equipment, trail car	.....	0.598
Power, motor car	5.490	9.452
Power, trail car	.....	4.140

While, as stated, the figures given are for only one of the interurban lines of the company, it is expected that the savings on the other interurban line will be not greatly different from those mentioned.

Interstate Bus Regulation Desirable

The History of All Industry Shows that Control of Competition Between Utilities Is Desirable—Interests of Manufacturers of Automotive Vehicles Should Gain, as Risk Would Be Removed—Mistakes of Earlier Regulation Should Be Avoided

By John A. Ritchie
President Yellow Coach & Truck Manufacturing Company

TO REGULATE or not to regulate? That is the question about interstate motor vehicle traffic. For although 41 states do regulate intrastate traffic, there is as yet no interstate regulation such as there is with steam and electric railroads.

The history of industry sheds light on the problem, though Bernard Shaw is reported to have said, "The great lesson of history is that no one learns any lesson from history," and Henry Ford said, "History is bunk." Neither of them was right, however, for we do learn lessons from history. We find that regulation arose from necessity and has developed by orderly evolutionary process.

When did regulation begin? In the days of pure savagery the sole and ruling social philosophy was the welfare of the individual. The savage, whatever else he lacked, had complete personal liberty. No one has had it since, for as savagery developed into barbarism and barbarism into civilization restrictions or "regulation" of personal liberty became greater and greater, and all in the general interest. The history of civilization is the history of progressive curtailment of personal liberties. In all civilized countries the welfare of society as a whole now far outweighs all concern over the individual.

This evolution in political rights and usages has had its counterpart in industrial rights and usages.

The necessity of regulation grew out of evils due to unrestricted competition, or, as it is generally called, "cut-throat" competition. From the time of Adam Smith, the first great economist, and for more than a century, the slogan "Competition is the life of trade" was accepted without question. But in time it was found that unrestricted competition was often the death of trade.

The belief was that competitors, in seeking trade, would try to excel each other in quality of output and reasonableness of prices. But it did not always work out that way. Many evil results arose from cut-throat competition, such as unrestricted child and female labor, corruption in public office, strangulation of competition by rate wars, rebating, greatly increased "overhead" or cost of doing business, needless duplication of facilities, and economic waste of many sorts, the cost of which all came out of the ultimate consumer in higher prices.

The problem is to preserve that idea involved in the word "competition" which we call "emulation" (or the effort to do things better and cheaper) while eliminating the evils of cut-throat competition. Thus the principle of regulation in industry arose, as a step between unrestricted private ownership and control and governmental ownership and control.

In the early days railroads, electric cars and stagecoach lines were regarded as much private business as a grocery store; but it was not many years before the fact that they were "impressed with the public interest," to use the legal phrase, became evident to everybody. The necessity of some regulation was clear and they were placed in that special legal category of businesses which affect the lives of every one and are called "public utilities."

It was recognized that in consolidation and unit control great economies could be effected. Economically centralization had its advantages. But the private control of prices was regarded as a source of evil, so pub-

lic utilities are no longer permitted to make their own rates; they are established by regulatory authority. While the power of oppression has gone, the economic advantages of co-ordination remain. And in a true sense public utilities are no longer evil monopolies. They are unified or co-ordinated industries.

The commercial transport of passengers and goods by automotive vehicles is a relatively new addition to our complete transportation machinery. The important thing to recognize is that it is a part of our national transportation machinery and, since it affects the electric railroads and the steam railroads, the nation has a very proper and deep concern in the basis on which it is or may be operated. To depend on individual competitive interest as a regulator is utterly to ignore the lessons of history. So the question is not so much one of recognition of principle as it is of the application of the principle. Has the time arrived for it, and what should the necessary legislation provide?

About these questions there is a great divergence of opinion and it will take time to pass the inevitable period of heated controvery to find all the basic facts and on them crystallize wise opinion in behalf of legislation making for the national welfare, upon which individual welfare depends.

In general, the interstate transportation agencies, electric and steam railroads, now under interstate regulation, feel that the new agency should also be regulated.

The organized motor coach operators feel the same way. Evidently some lessons have been learned from the cut-throat competition of the jitney period. Probably motor coach regulation now would not be premature, since the industry itself is for it.

Why Truck Operators Oppose Regulation

But motor truck operators, for the most part, are opposed, if not to the principle of interstate regulation, at least to the bill now before Congress and, indeed, any bill at the present time, and it is seldom wise to enact drastic laws with the opinion of the industry all against it. The psychological factor is one of great practical importance.

The truck operators argue:

1. That the total amount of interstate tonnage hauled by common carrier trucks in competition with the railroads is negligible, and, being all short-haul traffic, is not profitable to the railroads anyhow.
2. That trucks cannot economically do a long-haul business, and hence their operation, even though it involves crossing a state line, is essentially local.
3. That their rates average higher than railroad rates because they do the work quicker, pick up at point of origin of traffic and deliver at ultimate destination, and render other special services which railroads cannot render, and for these reasons their service is of special character and not wholly competitive with railroad service.
4. That automotive common carriers are not and cannot become a monopoly, since the customer, at all times, has the alternative of employing the private contract carrier or doing his own hauling, as so many industries are now doing.
5. That interstate regulation of common carrier trucks involves dangers to both private and contract haulage.

There are other arguments, and one may grant the validity of most of them, though, frankly, many untenable arguments have also been advanced, such, for example, as this: That "the railroads have returns guaranteed by the government," a misstatement that has been spread from one end of the country to the other.

Some of these arguments relate solely to the present situation, which is temporary, but we should also look to the future. Certain it is that the persistence of cut-throat competition at any time, in any form of public transportation, either interstate or intrastate, is contrary to the public welfare.

The very nature of the motor coach and motor truck business, covering, as it will in future years, all of the highways of the country, will make it necessary that there be some regulation.

The interstate commerce act in time became so drastic and it was applied so ruthlessly that it began to injure the railroads and limit their ability to serve. The same thing applies to the supervision exercised over street railways by state commissions.

We should aim to avoid all this in any regulation which is proposed for the motor coach and motor truck. The largest users of the motor coach and motor truck are going to be the steam railroads and the street railways. They have an especial interest, therefore, in the avoidance of drastic automotive regulation.

We should ask the question, were this need of regulation put up to the steam railroads and street railways as applying to their own business, whether they would be inclined to suggest the same kind of regulation they have suffered, or, whether they would not be inclined to offer many modifications which would give the railroads ample latitude in administrative and financial matters, and in management? Above all, we should ask them whether they would be inclined to subscribe to the principle that by law the net earnings of the steam railroads and street railway companies in their future automotive activities should be limited to a mere interest return on investment.

It would be better to suffer another year or so of irritation and then enact constructive legislation rather than to act too quickly and suffer ever after from destructive legislation.

Effect on the Manufacturer

Thus far no mention has been made of the particular interest of the automotive vehicle manufacturers, and it is an important factor in the problem.

Given a certain amount of service to be performed in any community, the provision of more facilities than are needed to perform the service represents an economic waste, which the ultimate consumer, in the end, has to pay for. To the manufacturer this can mean only one thing, a market filled with risk, or, to state it more strongly but just as truly, filled with certainty of bad risks, with an unavoidable increase in the manufacturers' prices to take care of those risks.

To sum the situation up as it now appears to us, the following conclusions seem justified:

1. That we cannot escape recognition of the principle of regulation.
2. Since the principle must be recognized our efforts should not be wasted in barren opposition, but centered upon constructive action.
3. That the time for federal regulation of the motor coach industry is generally recognized to be at hand and sufficient bodies of fact and competent opinion are available upon which to base a wise act.
4. That the situation in the motor truck industry is far different and that it would seem wiser to delay regulation in that department until a greater body of facts and a more general consensus of competent opinion in favor of regulation can be obtained.
5. That automotive regulation should avoid the mistakes of previous regulatory acts and put the industry in position to pioneer, to earn adequate returns and thus realize its greatest possibilities for the benefit of the nation as a whole.

Texas Properties Are Getting Results from Good Merchandising Work

FIRST ARTICLE

Houston, Galveston, Beaumont, El Paso, Austin, San Antonio, Dallas and Fort Worth Companies, Each with Its Own Peculiar Problems, Recognize Transportation as a Competitive Industry, and Are Energetically Developing Modern Merchandising Methods — Efforts Made to Relieve Traffic Congestion and Eliminate Parking

By John A. Dewhurst
Associate Editor ELECTRIC RAILWAY JOURNAL



This Picture of Dallas, from 3,100 Ft. in the Air, Shows the Extensive Development of This Metropolis

UNDER four different managements, the electric railway properties in the eight important cities of Texas are developing novel and effective methods of selling service. One gains the instant impression that in all of these fast-growing cities the personnels consist of wide-awake boosters who take a leading part in civic undertakings, and at the same time are providing an ever-increasing economical transportation service to their respective communities. There was, and still is, much to accomplish in changing the attitude of the public in order that the companies may keep pace with the enormous growth in population.

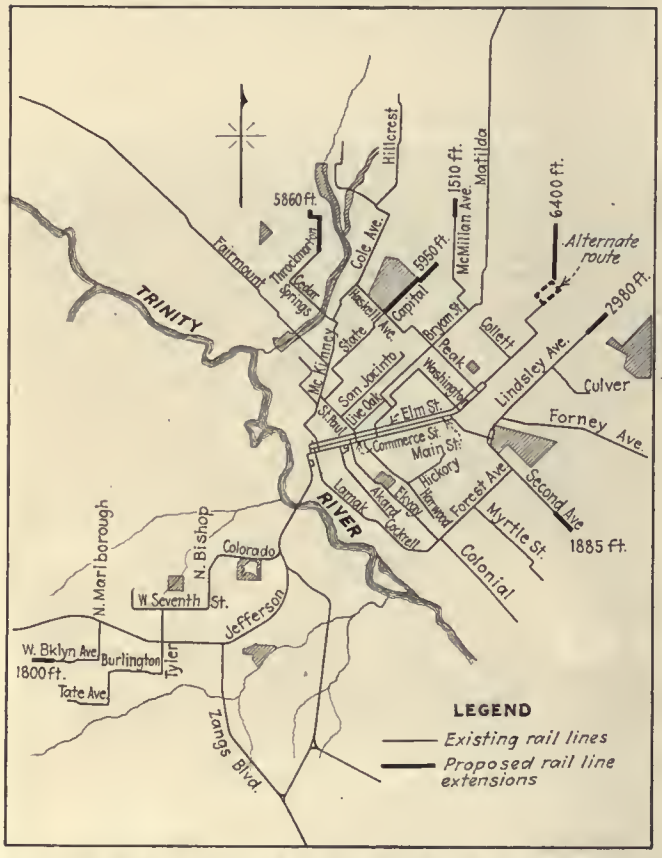
Dallas has just passed a new ordinance, giving the Dallas Railway a 7-cent fare with five tokens for 30 cents. This breaks the 5-cent fare basis that this city was slow to relinquish. The effect will be instantaneous. The company is already starting to expend $1,500,000 for much-needed extensions and betterments. The text of this ordinance and the plans of the company were presented in an article in this paper for May 1, 1926, page 750.

Interesting in this connection are the 5 miles of track extensions into new territory on seven lines, a part of which has heretofore been served by buses during the development period. The buses thus replaced will be used to extend still further into newly developed communities. Thirty new cars will be purchased and several more will be constructed new in the company's shops. In addition 50 more cars will be remodeled for one-man operation during the next few months.

Public relations in Dallas are the concern of the

entire personnel. To be sure, they are under the direct leadership of C. J. Crampton, manager of the publicity department, who is directly associated with Richard Meriwether, vice-president and general manager of the Dallas Railway. Both of these men appreciate that the important matters of selling transportation and the establishing of public relations are a part of every employee's job, and can be successful only so far as every man and woman in the company co-operates in the work. As was expressed by T. P. Walker of El Paso at the recent Galveston meeting, public relations work depends on personality, which in turn is composed of a multitude of little things.

Among the duties performed by the director of pub-



Map of Dallas City Lines, Showing the Rail Extensions of Railway Service Planned for This Year as a Part of the $1,500,000 to Be Expended in New Plant and Betterments

lic relations in Dallas is the directing of all advertising and the writing of all car cards for use on the system. In addition to this, the director makes many calls, trying to create at least ten new acquaintances every day. The people visited are the corner grocer, the butcher, or the drug store clerk in various parts of the city. Friends thus established are called on again and again, so that in the course of a year many thousands of people have a direct and frequent contact with a company official. Such men might otherwise never know other than the street car operators on their line. Obviously much valuable information is thus obtained that might otherwise remain a dark secret to the company.

A standing offer exists for suggestions that can be worked into cards of advertisements of five dollars for each suggestion that can be used. In addition the employee's name is used showing the origin of the thought.

In addition to this an informal lyceum bureau is maintained, and every day the Dallas Railway is called on to produce lecture or entertainment talent for various functions, from church socials to rotary luncheons in Dallas and neighboring communities served by the affiliated interurban lines to Denton and Terrell. Not all of such talent comes from the company's staff, and outside local talent is used extensively.

Many Ride-Selling Novelties in Fort Worth

In Fort Worth the street car system stands out above all other industries. One is conscious of a superior system from the time of entrance on the brilliantly painted cars of the Crimson Limited, until riding to the depot on one of the clean white painted single-truck cars or perhaps the latest type "No. 566." After reading the dash signs on all cars, "New model car No. 566 at your service," a genuine interest is aroused. This car is painted a light gray with a cream superstructure and a dark green roof. Inside, the car is fresh and clean, with battleship linoleum on the floor and a white enameled ceiling. The appearance of the fare box has been improved by nickelplating all metal parts. Many of the other cars are painted with white enamel on the exterior, making a very attractive appearance.

Selling rides in Fort Worth is a daily job of thinking up new stunts. Walter H. Burke, manager, and F. G. Gannon, assistant treasurer, have created many novel business-getting methods. When the American Legion had its convention in Fort Worth last fall, this organization wanted to provide its delegates with admissions to all events and transportation to and from places of meeting. The company printed books with the necessary tickets of admission, plus ten coupons, each of which was good for a street car ride during any of the four convention days. These books were distributed at the registration desk and when used the cover could be presented for a new book. At the close of the convention the company counted the coupons collected in the fare box and billed the Legion treasurer for nearly $1,500. Obviously the street cars were used much more extensively than would have been the case otherwise. Also the cost was lower than would have been possible had autos and taxicabs predominated, as so often happens at conventions.

Slogans painted in large letters on the outside of many of the city cars carry the railway's message home very effectively. Some of the slogans used are:

Our service is more convenient.
Parking time can be put to better use.
You are the one inconvenienced by parking.
Save the difference today and every day.
Park not, worry not. Ride the street cars!
Street car shopping is easiest.
Get the street car habit—it pays.
Don't try to park, use our service.
Parking time is money—Save it.
Howdy, folks! It's a pleasure to serve you.

Inside the car are displayed from time to time attractive messages that draw comparisons with facts well known. It is one thing to say the car mileage in Fort Worth is 18,000 daily, and another to say that this equals a round trip to Hong Kong every day. In these days $7,000 does not mean much, but to say that every car equals the price of a good home means much to the average passenger who is buying one and who is struggling to make payments on the mortgage.

A few of the thoughts used in these car cards are reproduced as being particularly meritorious:

Things Worth Knowing

The steel structure of our tracks weighs nearly 9,000 tons, or as much structural steel as contained in all the buildings in Fort Worth.

600 Horse-Power in Motors

That is the reason the interurban train provides you with speed and dependability.

Things Worth Knowing

The street cars in Fort Worth travel 18,000 miles per day, or the distance from Fort Worth to Hong Kong and back again.

Things Worth Knowing

The street cars in Fort Worth use 55,000 kilowatt-hours per day, or more than is used to light all the homes in Fort Worth.



A Traffic Scene Looking East on Main Street, Dallas, from the Intersection of Field Street

The Payroll

of this company is $1,000,000 per year, or $115 per hour for every hour in the year.

Another Thing Worth Knowing

A street car costs about the same as a good home, from $7,000 for a Birney car to $23,000 for an interurban car.

There is no ordinance in Fort Worth prohibiting smoking on cars, so the following card was designed and found effective in moving smokers to the rear:

Smoking a cigarette, pipe or cigar?
Why not go to the rear of the car?
That's the proper smoking place,
And you won't blow smoke in your
Neighbor's face!

Recently the Northern Texas Traction Company has contracted with a cleaning establishment to call for and clean and press two uniforms a month, free of charge, for every trainman. This costs the company 50 cents apiece for each uniform. Calls are made on a regular schedule. The appearance of the trainmen is naturally much improved.

Due to the scattered development of Fort Worth, relatively more trackage now exists per unit of population than is the case in many cities. Buses have been used for specific purposes previously and were discontinued when the object was accomplished, or when it was found that they were hopelessly unremunerative. On March 14 of this year a new bus line was started to a development at Oakhurst, and four buses now supply a fifteen-minute headway on this 3.2-mile line from 5:30 in the morning until midnight. A blanket franchise was obtained, allowing the company an opportunity of extending this type of service to other communities, as conditions warrant. Five 20-passenger buses were purchased, partly of Yellow Coach manufacture and partly Reos. A 10-cent fare is charged and express service is rendered from the downtown section to the new development at Oakhurst, which is beyond the district served by cars.

Free transfers are given from buses to cars. When a passenger boards a street car and desires to transfer to the Oakhurst bus, he pays a 10-cent fare on the car and receives a bus transfer, thus avoiding a second fare transaction when boarding the bus. This avoids inconvenience and saves time to passenger and operator alike.

Before the bus line was started an extensive selling campaign was instigated. An attractive four-page folder in colors was printed entitled "A New Transportation Service." In the folder a complete description of the new service is given, showing why the Northern Texas Traction plans to operate buses, the type of vehicle to be used, the service to be offered, giving schedule and fares, the route, and closing with a request for suggestions for improving the service. These folders were distributed from house to house by

the bus operators before the service was started. This gave the operators a valuable opportunity to become acquainted personally with many of the prospective passengers and to add a few words beyond what was said in the folder.

In addition to this, one of the buses was exhibited at the Fat Stock Show. The operators were again present to explain the service about to be rendered and to show visitors the new vehicle.

This year the third public speaking class has completed its course of twelve lessons. The company pays the costs of this instruction. The first class was for department heads; the second year assistants and junior executives were given the course, and this last year many other junior officials received this training, which is valuable because of the many opportunities that are always available for carrying the company's message to local community gatherings.

The Texas Electric Railway, which operates 282 miles of interurban trackage, besides rendering a high-grade service to the many communities served, also supplies a personal service to its patrons through its traffic organization. Any one desiring a Pullman reservation may apply to any agent and the order is telephoned over the company's private system, generally to Dallas, as this is the principal point on the system, where its riders transfer to steam railroads. The reservation is obtained and a confirmation phoned back to the local agent. The reservation is either held or picked up and paid for as instructed by the passenger.

A similar service is performed in obtaining theater tickets, baseball and football tickets, or reservations to any similar functions. Generally the company is able to obtain an allotment of seats to athletic games so that Texas Electric patrons can be assured good seats. These tickets can be paid for at the local company office or they be held and paid for on arrival.

To encourage riding, this company has advertised extensively a 20 per cent reduction in return trip tickets during April and May of this year. Results are not yet available to show whether this has increased riding or not. The standard reduction for return trip tickets is 10 per cent. Many other forms of reduced rate transportation are in effect to meet the individual requirements of the various localities served.

Chartered car rates have been revised so that definite rates are provided for parties of any size. This avoids the bad psychology of requiring a party of 30 to pay for 40 tickets in order to obtain a private car.

James P. Griffin, vice-president of the company in charge of the traffic, has stated that the transportation companies must adapt their service and schedules to fit the requirements of the riders and not expect the public to change its plans to meet the old-time standards of fares and schedules. Traffic rules and methods of handling special business are assembled in a handy book which is given to all agents and conductors.

Railway Operates from Union Bus Station at Rochester

ALL INTERURBAN bus and trolley lines of the New York State Railways in Rochester, N. Y., are now operating from a union terminal. The Rochester & Eastern and Rochester & Sodus trolley lines, hitherto using the terminal at Exchange and Court Streets, now operate from the Bus Terminal building at South Avenue and Broad Street. The old trolley station is to be abandoned.





Front and Rear Views of the Dallas Interurban Terminal Building Used Jointly by the Texas Electric Railway, the Texas Interurban Railway and the Northern Texas Traction Company

The move is in the interests of economy, James F. Hamilton, president of the railways, announced. Under a new routing schedule, the interurban trolley lines are to enter South Avenue via St. Paul and Andrew Streets and leave the terminal through Court Street to Clinton Avenue. No new tracks are necessary.

Where the company has hitherto used the Broad Street, or side entrance, for unloading and loading bus passengers, the entire lower floor of the building has been taken over by the railways and the front entrance used for trolley passengers. The station will be enlarged within a short time.

The merging of the trolley and bus stations will not affect the terminal for the Rochester & Syracuse, Buffalo, Lockport & Rochester and Lockport & Buffalo lines at the Erie Station.

The New York State Railways took over the bus terminal, previously operated by independents, early in 1925, after the traction company had acquired control of every bus line entering Rochester with one exception, the Rochester-Batavia-Buffalo route.

Better Car Routing and Traffic Control Proposed for Baltimore

FIRST ARTICLE

Report Presented to Traffic Survey Commission of Baltimore by Kelker, De Leuw & Company Proposes Radical Changes in Street Car Lines and Handling of Vehicle Traffic, Particularly in Central Business District—Many Detailed Counts Taken Show Seriousness of the Problem

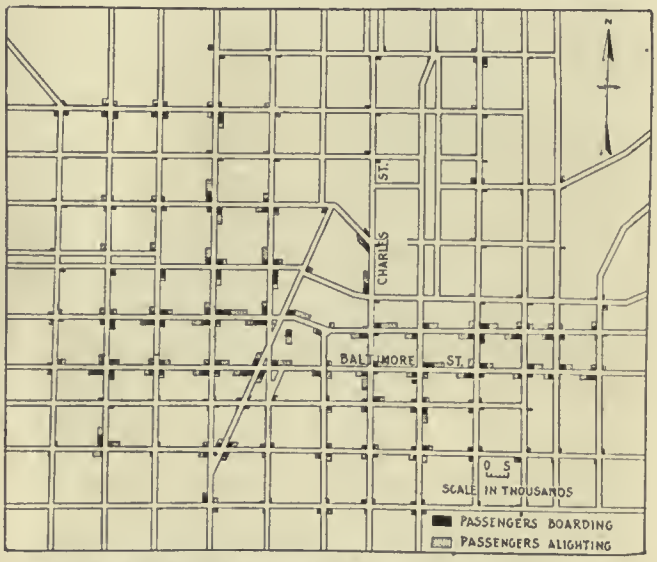
REROUTING of street cars and buses, traffic control and carrying out of a major traffic street plan are the three methods proposed for the improvement of traffic conditions in Baltimore, Md., by Kelker, De Leuw & Company. These recommendations are incorporated in a report presented to the Traffic Survey Commission of Baltimore after an investigation covering six months. While the report states that the efforts of the engineers have been directed to the preparation of recommendations that would specifically conform to local conditions, much of the material contained is general in character and is applicable to similar problems in other cities. The following is a greatly condensed abstract of the principal features of the report.

Development of the modern skyscraper, at first without restrictions as to height, is given as the primary cause of traffic congestion. Zoning ordinances, where they have been adopted, have been of assistance, but, in the opinion of the engineers, there has been no real effort to restrict building construction to conform with the limits which are imposed by the available street space in the zoned areas. Consequently it is not uncommon to find housed in a single building during the working hours a population equivalent to that of a small city, with the street on which the building fronts having sufficient space only for the needs of a small town. To sum up, there are five principal causes of congestion:

1. High buildings, causing concentration of large numbers of people in small areas;
2. Insufficient roadway and sidewalk space in the streets on which such buildings front;
3. The ever-increasing number of pleasure and commercial vehicles without a corresponding increase in roadway space;
4. Failure to provide a sufficient number of well-paved streets and to maintain them;
5. Use of a portion of street space for the parking of vehicles, thereby reducing the space available for moving vehicles.

Among the means which have been adopted by various cities for improvement of traffic conditions the following are listed:

1. Rerouting of street railway and bus lines;
2. Elimination of left-hand and right-hand turns at certain intersections and in certain areas;
3. Control of pedestrian traffic;
4. Elimination of parking, both partial and complete, in congested districts;
5. One-way streets;
6. Automatic signals with unit control;
7. Electric signals manually controlled;
8. Safety zones for street car passengers;
9. Segregation of various classes of traffic;
10. Creation of boulevards and through streets;
11. Minor changes and improvements in roadway and sidewalk design;



Passengers Boarding and Leaving Street Cars in the Central Business District from 6 A.M. to 7 P.M. on a Typical Week Day in November, 1925

12. The removal of obstructions from sidewalks and their full utilization, from building line to curb, for pedestrian traffic;
13. Street opening and widening projects to secure an adequate system of major traffic and distributor streets;
14. Construction of underground or overhead structures for partial removal of street railway lines from the downtown district;
15. Construction of subway or elevated railroads to provide rapid transit service, and
16. Construction of pedestrian tunnels.

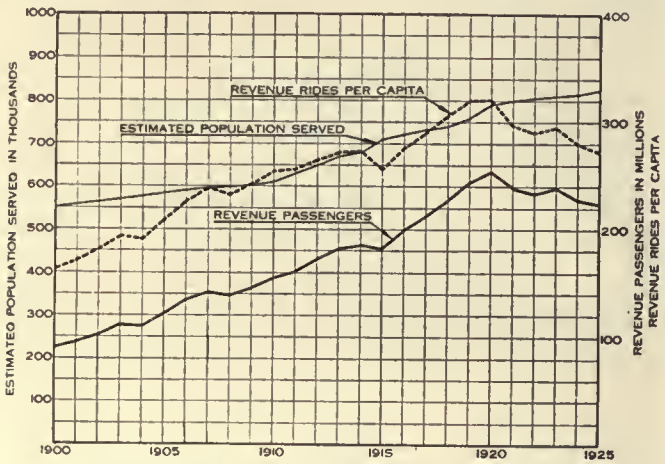
The general plan of the downtown streets in Baltimore shows a great similarity to that of a century ago. As the city grew the streets were extended and homes were located along and adjacent to the major radial streets, following the expansion of the street railway system. The congestion in the central area, due largely to the construction of high buildings in the retail, financial and wholesale districts, would be greater were it not for the accomplishment of the Burnt District Com-

mission in widening the streets after the fire of 1904. The City Plan Committee has done able work in preparing for the future by outlining a system of major streets and also in carrying to completion many important widening and opening projects. The United Railways & Electric Company has extended its lines and increased its service to meet the demands of the growing population. Bus service has been introduced to supplement the street railway service. The routing of the lines has been in general of such a character as to require the least possible amount of transferring and also to follow closely old-established lines of travel in carrying passengers to and from the downtown district.

Despite all the street improvements now under way or in contemplation, and despite the increases in street railway and bus service, the great increase in the use of the motor vehicle has brought about congestion in traffic movements throughout the city, and in the central business district in particular, which requires coordination and additional measures of traffic control so as to obtain the most effective use of the streets.

Growth in Motor Vehicles Enormous

Since 1915, the increase in the number of annual revenue passengers carried by the United Railways has been 42,000,000 (23 per cent) and in motor vehicles registered 61,000 (307 per cent). During 18 hours of



Annual Revenue Passengers Corried, Rides per Capita and Population Served by the United Railways & Electric Company of Baltimore, 1900-1925

a normal week day 176,000 motor vehicles enter and leave the central business district, the corresponding number for the maximum hour of the afternoon rush being 14,000. Using the most accurate data available, and checking carefully with the experience of other cities, it is estimated that at the end of 1930 the number of motor vehicles registered will be 154,000, and that the number of motor vehicles entering and leaving the central business district for the eighteen-hour period will be 308,000 and for the maximum hour 24,000.

With this change in the situation imminent, the problem is not only to relieve the conditions of today but to plan wisely for those of tomorrow. While the recommendations for street railway and bus routing and traffic control may appear radical and drastic, say the engineers, if nothing is done shortly to reroute the street car lines and effectively to co-ordinate traffic control, these measures will seem mild when compared to the regulations required to meet the conditions five years hence.

Rerouting of street railway lines in a large city is a complicated matter, as the limitations imposed by street space, track capacity and service require that each line be fitted in carefully with the other lines to make a complete and workable plan. Obviously, no rerouting plan can be proposed that will exactly divide the benefits and inconveniencies for each one of the million daily passengers of the car lines and for the several hundred thousands of motorists who use the streets. The recommendations will benefit greatly the large majority of all persons using the streets and will be, if adopted, a long step forward to meet traffic conditions of the future, in the opinion of the engineers.

A summary of the recommendations follows:

Street Car and Bus Routing

(a) A detailed rerouting plan is given later in the report. In the most congested portion of the downtown district nearly 70 per cent of the turning movements made by street cars are eliminated and in the entire area bounded by Greene, Centre, Gay and Camden Streets the reduction in turning movements is 35 per cent. All traffic movements will be benefited by the discontinuance of street car operation on Lexington, Saratoga and Sharp Streets.

(b) A "limited stop" service which will decrease the number of possible stops during the rush hours only, from ten to about eight per mile, is recommended. During the day from 9 a.m. to 4 p.m. and also during the night hours after 7 p.m. all present stops will be made. This change will not only decrease the traveling time of the vast majority of car riders but will also save considerable time for motorists.

(c) The increase in traffic in the downtown district since 1916 has been such as to require a modification in the street railway service standard and it is recommended that the 15-minute period by which violations are determined be extended to a 30-minute period.

(d) When street railway tracks are reconstructed in the downtown area realignment is recommended so as to remove a number of points of congestion by making a more equitable distribution of roadway space.

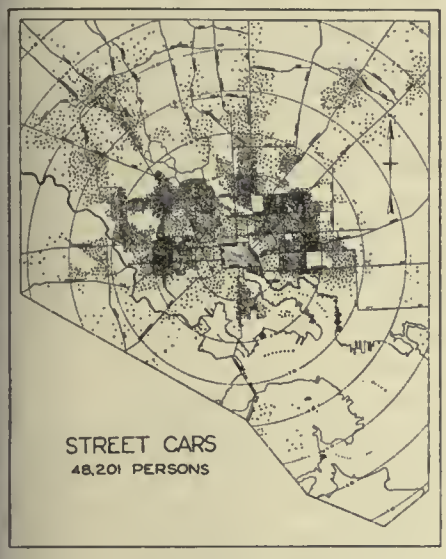
(e) The shortening of the existing loop used by all bus lines entering the downtown district on Fayette Street is recommended, as well as the installation of new bus lines in parts of the city where transportation is now lacking, such as on Washington Boulevard and on Annapolis Boulevard.

Traffic Control

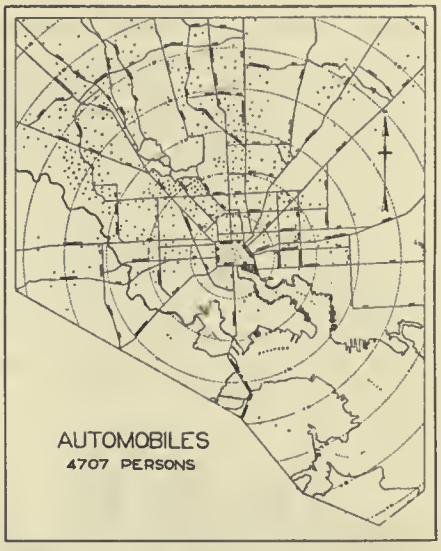
(a) The immediate installation of automatic signals is recommended at 14 intersections in the central business district and a later installation of the same type of signals at 64 additional intersections, making a total of 78. In the outlying districts of the city the installation of automatic signals is recommended at 34 intersections and this number is to be increased to 76 by subsequent additions.

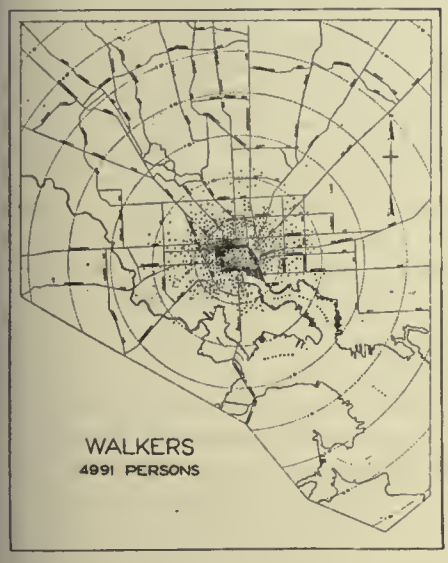
(b) With the installation of the automatic signals it is recommended that measures be taken to co-ordinate the movement of pedestrian traffic with the signals. This is one of the most effective safety measures that can be adopted and it has a further advantage in that it facilitates the movement of all classes of traffic.

(c) While there is no present need to prohibit parking throughout the day in a large portion of the downtown area, there is no doubt that traffic conditions would be improved if the present regulations were extended to cover a slightly greater area and the period of pro-



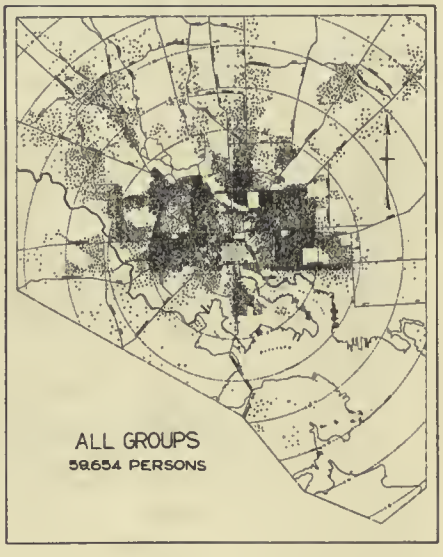






Residential Distribution of 59,654 Persons Employed in Baltimore's Central Business District

These charts, which were made from a survey of employees in leading business houses, show classification in accordance with means of transport used. The central district is the trapezoidal area in the center of each chart. Each dot represents ten persons.



hibition in the afternoon advanced from 4:45 p.m. to 4:15 p.m., and these changes are recommended.

(d) Because of delays occasioned by the delivery of coal during the periods of heavy traffic movement, it is recommended that such deliveries in the downtown district be made at times other than during the morning and evening rush hours.

(e) A change in the existing statutes and laws pertaining to traffic regulations is recommended so that all vehicles moving on street car tracks, in addition to street cars, shall be passed on the right. The change is desirable as a safety measure and also to facilitate the movement of traffic.

(f) On many of the sidewalks and roadways in the downtown area there are numerous obstructions such as cellar entrances, light wells, steps, fruit and vegetable stands, etc. Such obstructions should be removed wherever possible.

(g) The adoption of a system of through streets, in the interest of safety and improved traffic conditions, is recommended. For the initial step 18 streets have been selected and this number, by subsequent additions, should be increased to a total of 39 streets.

Major Traffic Street Plan

(a) The major street system designed by the City Plan Committee has been carefully studied in connection with many traffic counts, surveys and observations of the physical conditions affecting the plan. As a result of this work this plan as outlined, with a few modifications, is fully indorsed.

(b) A system of inner distributor streets encircling the central business district is recommended, utilizing as far as possible existing streets of adequate widths. The essential work can be carried on by progressive steps to meet the increasing traffic of coming years.

(c) To supplement the inner system an outer distributor street system is also recommended. The downtown street system cannot care for both the local and through traffic, and a convenient system of streets must be provided for the through traffic so that it may be deflected from the streets in the downtown area.

(d) To insure adequate means of egress and ingress to the downtown district the widening, when possible, of a number of the existing arterial thoroughfares is recommended.

(e) The widening and opening of both Howard Street and Franklin Street and the construction of the Franklin Street viaduct, together with certain streets connecting with the inner distributor street system, are recommended.

(f) The opening of an east-and-west street between North Avenue and Cedar Avenue which will connect the section of the city lying east and west of Jones Falls is recommended.

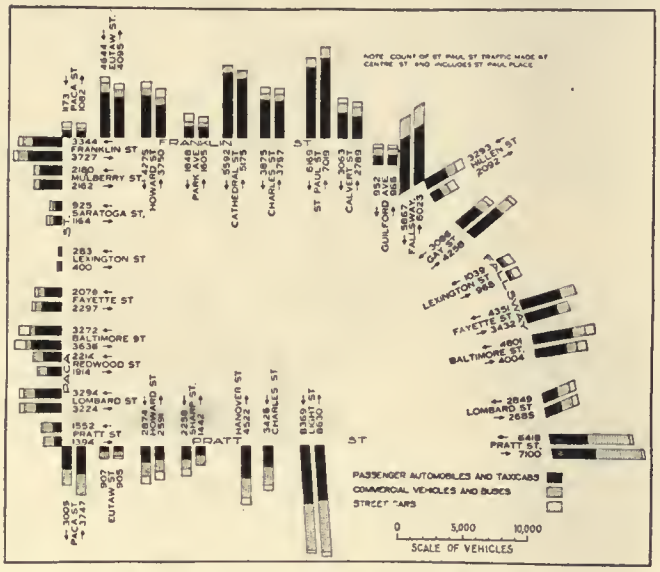
(g) In the central business district the widening of

Pratt Street between Light and Paca Streets, together with some minor improvements, is recommended.

(h) Some of the recommendations contained in the report of the Committee on Traffic (1923) are being carried out and a number are covered directly or indirectly in this report. Other important items of the 1923 report are recommended.

BALTIMORE'S POPULATION CONCENTRATED

For a city having such a large population (at present estimated 790,000) Baltimore is unique in that so great a proportion of its people reside within a comparatively short distance from the central business district.



Number of Vehicles Entering and Leaving the Central Business District of Baltimore from 6 A.M. to 12 o'Clock Midnight on Oct. 19, 1925

Approximately 625,000, or 79 per cent, reside within a radius of 3 miles from Baltimore and Charles Streets. Recently there has been considerable development in the outlying residential zones, which has caused a small reduction of the population in the inner zones and a corresponding increase in the outer zones. The density of population by mile zones is as follows:

DISTRIBUTION AND DENSITY OF POPULATION IN BALTIMORE, 1925

Zone Radius, Miles	Population Accumulated Totals	Per Cent of City Total	Persons per Acre (Land Area Only)
1	120,200	15.2	64.8
2	435,100	55.0	60.4
3	625,100	79.1	40.3
4	693,400	87.7	25.9
5	752,500	95.2	19.4
City Limits	790,600	100.0	15.7

Note: Circles centered at Charles and Baltimore Streets.

The zoning regulations limit the height of buildings in the central business district to 2½ times the width of the street on which they front. The average height of buildings in the district bounded by Franklin, Calvert, Lexington, Holliday, Pratt and Paca Streets is now four stories or about 52 ft. Under the zoning regulation enough additional high buildings could be constructed to bring this average up to 17 stories or 180 ft. Although the height regulation is as sound as in any other city a concentration of business activities four times greater than that of today is possible. The volume of traffic on sidewalks and roadways which would result unless there were a corresponding increase in their width can scarcely be visualized.

The existing street railway system comprises some 35 lines, the cars on 27 of which operate into and out of the central business district. In addition to the street railway lines there are three bus lines reaching this district, and several lines in the outlying districts where buses are used as feeders to street railway lines. In all, the United Railway & Electric Company operates 415.8 single-track miles of street railway lines (60 of which are on private right-of-way and 18.5 on reserved portions of streets), 47.7 miles of bus lines and 6.6 miles of trackless trolley.

Of the 316,428,497 revenue and transfer passengers carried during the year 1924, 260,453,100, or approximately 82 per cent, were carried on the lines which give direct service to the central business district. Of the remaining 55,975,397 passengers 2,095,223 were carried by shuttle service lines which are virtually extensions of lines operating to the central business district. The crosstown feeder lines carried 53,880,174, or approximately 17 per cent of the total passengers.

A count of the number of passengers boarding and leaving street cars in the central delivery district (the area bounded by Greene, Centre, Gay and Pratt Streets) was made during November and the early part of December, 1925. The chart on page 883 shows in diagrammatic form the total number of passengers boarding and leaving cars at each corner during the 13-hour period from 6 a.m. to 7 p.m. on a typical week day. It will be noted from this diagram that a large part of the delivery and pick up of passengers is made in a comparatively small area. As a matter of fact, of the 396,000 persons observed in the entire central district 136,000, or over one-third, got on and off the cars in the area bounded by Howard, Saratoga, Charles and Baltimore Streets, which is about one-ninth of the area of the entire district. This indicates the necessity of operating a large number of cars on the tracks in this area if the patrons of the street railway lines are to be served conveniently.

Revenue passengers increased gradually from 155,000,000 in 1910 to a peak of 254,000,000 in 1920, decreasing to 224,000,000 in 1925. This falling off in revenue passengers can be attributed partly to a decline in post-war activities, partly to the increase in the use of passenger automobiles, partly to the use of second transfers and partly to the extension of zone fares. The number of revenue rides per capita served was 272 in 1925 compared with 254 in 1910 and 321 during the peak year, 1920. This information is shown graphically in one of the charts.

The quality of service has been well maintained. As a matter of fact, the seat-miles have been increased at a more rapid rate than the car-miles, which have kept pace with the number of passengers. The street railway system is being managed efficiently, but if the passenger traffic continues to decrease new methods of reducing the operating cost, in addition to those which have been put into effect during the past few years, will have to be employed. Among the possibilities that present themselves are rerouting, "limited stop" service during the morning and evening rush hours, provision of more cars of the type that will save time by making faster interchange possible, and the adoption of a method of selling tokens and of issuing transfers that will reduce delays in loading.

Three of the railway's bus lines operate to and from the downtown district. Two of these are operated on

a seat-for-every-passenger basis at a 10-cent fare. They do not compete directly with the cars. The Fayette Street bus line, largely controlled by the United Railways, is operated in direct competition with the street cars. The latter could easily perform the service rendered by these buses.

In addition to the local street cars and buses there are several interurban and interstate bus lines which take up considerable space operating over and standing in congested streets. The majority of the interurban bus lines operate from the city limits to various suburban communities.

Street Traffic Analyzed

In order to obtain all pertinent facts with respect to street traffic conditions in Baltimore field surveys were made including (1) a cordon count of all vehicles and passengers entering and leaving the central business district; (2) a count of vehicles at nearly all the intersections in this district; (3) a count of pedestrian traffice at principal points of sidewalk congestion; (4) a check of the speed made by automobiles on various streets; (5) a count of vehicles at principal intersections throughout the municipal area, and (6) a survey of the speeds made by the principal street railway lines.

The results of the cordon count are shown in one of the diagrams. An analysis of the count shows that out of a total of 206,653 vehicles, the division was:

Type of Vehicle	Number	Per Cent
Street cars	19,138	9.2
Passenger automobiles	123,906	60.0
Taxicabs	5,840	2.8
Buses	1,111	0.5
Commercial motor trucks	45,697	22.2
Horse-drawn vehicles	10,961	5.3

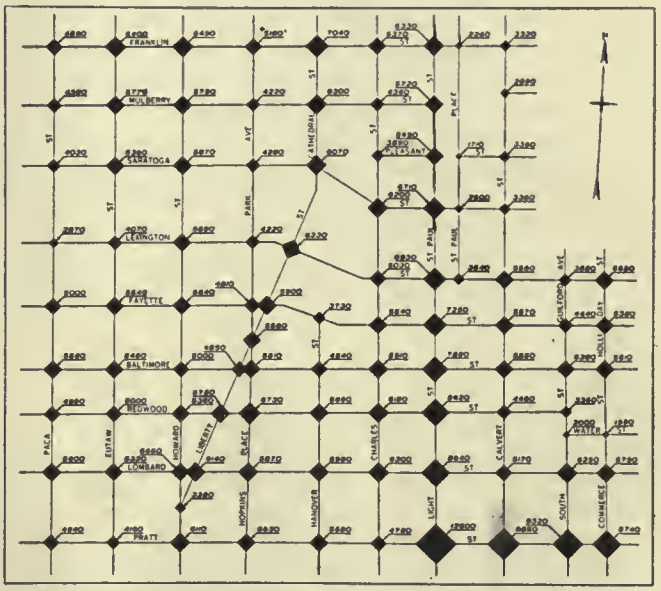
During the hours from 7 a.m. to 6 p.m., 160,120 vehicles entered and left the central business district, an average of 14,556 per hour, and during the hour from 5 to 6 p.m., the maximum traffic hour of the evening rush period, the number entering and leaving was 16,566. The count shows that the large majority of commercial and horse-drawn vehicles, the slower moving types, used the streets in the southern portion of the district. Of a total of 56,658 commercial and horse-drawn vehicles 26,677 or an average of 2,223 per checking station crossed the 12 stations on the cordon south of Baltimore Street, while 29,881 or an average of 1,428 per checking station, crossed the cordon at the remaining 21 stations north of Baltimore Street. This gives some idea of the value of the wider streets in the section along the wharves and docks and in the wholesale district.

During the 18 hours from 6 a.m. to 12 midnight, there were 749,376 persons carried on the various conveyances, as follows:

Kind of Vehicle	Passengers	Per Cent
Street cars	511,389	68.3
Passenger automobiles	209,794	28.0
Buses	16,780	2.2
Taxicabs	11,413	1.5
Total	749,376	100.0

The public transportation facilities, street cars, buses and taxicabs, carried 72 per cent and the automobiles 28 per cent of the passengers. Comparing the number of passengers carried by street cars with the number carried by private automobiles it will be seen that the street cars carried 71 per cent and the private automobiles 29 per cent during the 18-hour period. During the maximum traffic hour of the morning and afternoon rush periods, however, the street cars carried almost 4½ passengers for each passenger carried by automobiles in the direction of heaviest traffic. This is shown by the following summary:

Maximum Hour	Passengers: Street Cars	Passengers: Automobiles	Ratio of Street Cars to Automobile
7 to 8 a.m., inbound	39,631	8,721	4.54
5 to 6 p.m., outbound	55,514	12,509	4.44
Total	95,145	21,230	4.48



Traffic Flow at Intersections in the Central Business District, 12 Noon to 6 P.M. on a Typical Week Day, October and November, 1925

Similar cordon counts have been made in other cities. For comparison the results of these counts are compared with the count in Baltimore:

City and Date	Number of Vehicles	Approximate Area of District, Square Miles
St. Louis (August, 1925)	138,366	0.99
Baltimore (October, 1925)	160,120	0.49
Detroit (June, 1924)	197,967	0.58
Los Angeles (November, 1923)	280,973	0.66

The volume of vehicular traffic at the intersections in the downtown district of Baltimore between 12 noon and 6 p.m. is shown graphically in the diagram on this page. Other charts, not reproduced, show the volume on each street between intersections and similar data for the evening rush hour. It will be observed from the diagram that the traffic at the various intersections throughout this district was very evenly divided with the exception of the intersection along Pratt Street east of Charles, which were the heaviest, and the intersection along St. Paul Street, which were heavier than those along any other north-and-south street. The volume of traffic during the hour from 5 to 6 p.m. shows practically the same conditions, except that the traffic at the intersections along Cathedral Street was much heavier proportionately than during the other five hours of the count.

Checks of pedestrians crossing the intersection of Lexington and Howard Streets and the adjacent blocks show that 50,510 pedestrians crossed the streets and that 21,802, or about 30 per cent of the 73,312 pedestrians observed, crossed the streets adjacent to the

intersections, between blocks. This argues well for pedestrian traffic control, as jaywalking is one of the chief sources of accidents.

Street Car Speeds Low

Many checks were made of street car speeds. The results are shown in a series of charts included in the appendix of the report. The speeds of cars outside the central district range from 6 m.p.h. to 16.4 m.p.h. The speed in the central business district ranges from 3.4 m.p.h. on Charles Street between Saratoga and Lexington to 12.9 m.p.h. on Calvert Street between Franklin and Mulberry. In general the speed of street cars in Baltimore is slower than that in most large cities. This is due to several factors, chief of which are the narrowness of the streets on which most of the lines are operated and the short distances between some of the stopping places. For the purpose of comparison the schedule speeds of street cars in a number of cities are given in the accompanying table.

SCHEDULE SPEED OF STREET CARS IN VARIOUS AMERICAN CITIES

City	Average Speed, M.P.H.
Baltimore	9.5
Buffalo	10.0
Boston (surface lines only)	10.5
Chicago	11.2
Cincinnati	10.0
Cleveland	10.5
Detroit	10.1
Milwaukee	10.1
Philadelphia (surface lines only)	10.0
Pittsburgh	9.4
San Francisco	10.2
Washington	10.2

In Baltimore the distribution of population is such that the time required for the majority of residents to travel from residence to place of employment or business would be comparatively short if the cars made the speed which it is possible for them to make with safety. Therefore, an increase in the speed made by the street cars must be one of the salient features of any plan to improve transportation service. The "limited stop" service which is recommended in the report, it is stated, will do much to reduce the time spent on street cars. It should also be pointed out that the restriction on the speed of cars while crossing intersections in the downtown district should be made less stringent. A time saving would thus result and the higher speed would be reflected in a somewhat better movement of all classes of traffic.

With regard to the designation of one-way streets, the engineers hold that the possibilities of improving traffic conditions by creating additional one-way streets beyond the four now in use was given careful consideration and it does not appear that any particular improvement could thus be obtained.

Roadway Obstructions

Traffic is impeded and in turn causes congestion at quite a number of points in the downtown district because roadway space which should be used for moving traffic is occupied by traffic semaphores, push carts and temporary huckster and vendor stands. All of these have fulfilled a useful purpose in the past, but the increasing need for more roadway space due to the growth of the city and the constantly increasing vehicular and pedestrian traffic has brought about a condition where the space used by them would be more valuable to the city at large if it were kept free for the purpose for which it was intended. A comparatively small stationary object in a roadway diverts traffic from its course, retards its flow and causes congestion. The congestion is more than proportionately increased when an entire traffic lane, and in some instances two lanes, is obstructed by such objects. Traffic congestion adds to the cost of operating commercial as well as pleasure vehicles and consequently increases the cost of doing business. Therefore all possible measures to prevent it should be taken, and among the first should be the utilization of roadway and sidewalk space for the purpose originally intended, by removing all obstructions to traffic therefrom. Traffic semaphores should be replaced by more modern equipment and if possible other quarters should be provided for push carts and the like. In any event they should not be permitted to utilize roadway or sidewalk space.

Sidewalks in the heart of the retail district are comparatively narrow. This is particularly true of those which carry the greatest volume of pedestrian traffic, namely, along Lexington Street. It is also true of the sidewalks along Charles Street. The complete utilization for pedestrian traffic of some of the sidewalks, narrow as they are, is made impossible by cellar openings, light wells, doorsteps, waste paper boxes and kiosks. The time has arrived when the available sidewalk space in the shopping district is being used at some time of the day up to the limit of its capacity and in some cases pedestrian traffic overflows into the roadway. Three measures can be adopted to meet this situation: (1) Set back the building line; (2) widen the sidewalk by reducing the width of the roadway, and (3) remove all obstructions from the sidewalk and utilize the full width from building line to curb for pedestrian traffic. Of the three, the last is the most practical and can be wholly or partially accomplished with comparatively little expense.

Canvass of Residential Distribution of Workers

It was decided to make a canvass of large groups of persons employed in the downtown district and several of the more important industrial districts so as to determine the modes of transportation used and whether or not the transportation facilities were so located as best to serve those using them. All members of the Baltimore Chamber of Commerce gave full co-operation in making the survey, and 112,642 persons answered a questionnaire.

The means of transportation between residence and business places used by 79,831 persons engaged in the downtown district are shown in the accompanying table:

MEANS OF TRANSPORTATION USED BY 79,831 PERSONS EMPLOYED IN THE DOWNTOWN DISTRICT OF BALTIMORE

	Central Business District		Outer Area		Total Downtown District	
	Persons	Per Cent	Persons	Per Cent	Persons	Per Cent
Street cars	50,012	79.5	11,895	70.2	61,907	77.5
Buses	1,816	2.9	165	1.0	1,981	2.5
Total	51,828	82.4	12,060	71.2	63,888	80.0
Steam and interurban railroads	595	1.0	181	1.1	776	1.0
Total	52,423	83.4	12,241	72.3	64,664	81.0
Passenger autos	5,478	8.7	1,317	7.8	6,795	8.5
Walkers	4,991	79.9	3,381	19.9	8,372	10.5
Grand total	62,892	100.0	16,939	100.0	79,831	100.0

The outstanding fact shown by the table is that over four-fifths (81 per cent) of the persons canvassed used the collective transportation agencies. Those using

automobiles and taxicabs amounted to 8.5 per cent of the total and 10.5 per cent walked. In the outer area, the proportion of walkers is 2½ times that in the central business district. This is due to the close proximity of residences to the outer edge of the downtown district.

The same information is presented graphically in the set of maps of the city, with dots representing the distribution of the workers. The comparatively small numbers using individual means of transportation are quite evident.

Similar data were collected for seven principal industrial districts. In general the same conditions hold as in the central district. Out of a total of 31,034 persons counted 16,966 or 54.7 per cent used street cars; 389 or 1.2 per cent used buses; 32 or 0.1 per cent traveled by railroad; 2,264 or 7.3 per cent used automobiles, and 11,382 or 36.7 per cent were walkers. It was also found that there is to a great extent an avoidance of superimposing the rush hour traffic of the outer industrial districts on that of the central business district. Of the 31,034 persons canvassed in the seven industrial districts only 8,000 or about 25 per cent are required to travel through the central district on street cars in going to and from work.

In the second article, to appear in a subsequent issue, the car routing and plans for betterment of traffic through improved control and a major traffic street plan will be discussed.

Time for Ticket Sorting Reduced 50 per Cent

SEPARATING of tickets from coins as they are received from fare boxes is a considerable problem on most electric railways. In Erie, Pa., a shop constructed blower device has reduced the time of sorting 50 per cent. Tickets and coins as they come from the fare box are placed in the hopper of the machine



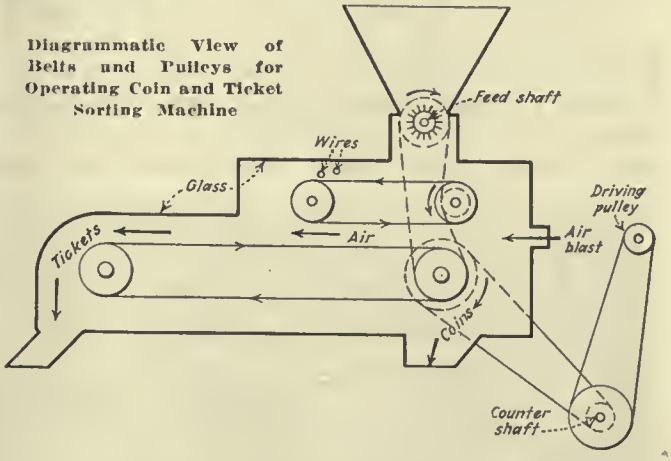
Ticket and Coin Sorting Machine Used by the Erie Railways

and a feeder shaft delivers them on top of a belt. As they drop from this belt to a lower one a blast of air blows the tickets out the far end of the machine, while the coins remain on the belt and drop down into a chute, which delivers them through an opening at the opposite end of the machine. The accompanying halftone shows the construction of the machine and the line diagram gives an idea as to its operation.

A blower from a Peter Smith heater is used to supply the air. It is driven by a ½-hp. motor. The motor shaft is also provided with a pulley which is belted to a countershaft directly underneath. From this countershaft a belt leads to the driving shaft of the lower coin belt, and another pulley on this shaft is connected to the feeder shaft. A pulley on the top coin belt shaft rests against this connecting belt and so is driven from it.

The hopper is 18 in. diameter at the top and slopes to 6 in. diameter at the bottom. The feeder shaft passes through the bottom of the hopper and is pro-

Diagrammatic View of Belts and Pulleys for Operating Coin and Ticket Sorting Machine



vided with teeth which are welded onto the shaft in eight rows. The center teeth project 2½ in. above the shaft and these slope toward the edge so as to conform to the curvature of the opening at the bottom of the hopper.

In order to prevent coins and tickets from becoming lodged at the sides of the belt, wooden blocks overlap the belt for a space of ¾ in. on each side. There are also two cross wires provided a short distance from the bottom of a hopper, which, passing across the upper feeding belt, prevent coins from rolling and insure that they lie flat on the upper belt. Otherwise, it was found that the rolling coins might continue to roll along the lower belt and so pass out of the opening intended only for the tickets. To enable the operator to see what is happening inside and also for convenience of cleaning the machine, glass slides are fitted to the top of the machine through which the coins pass.

In operation, the coins and tickets as they are fed from the hoppers are deposited on the top belt, which is 13 in. from the center of the hopper to the extreme end. The blast of air from the blower passes between the surfaces of the two belts and the tickets are blown out as they drop from the top to the lower belt, while the coins drop down to the lower belt, the top of which is 6 in. below the upper one. This lower belt passes over pulleys which have centers 27 in. apart, and its top travels in the reverse direction from that of the shorter belt. Coins as they drop from the upper to the lower belt are thus conducted back to the starting end of the machine and pass out an opening and fall into a basket underneath placed to receive the coins. The tickets, on the other hand, are blown out at an opening the opposite end of the machine and pass into a similar basket arranged underneath the opening at that end. The upper belt is made of canvas, since it is take-up bearing is provided at the far end of the lower belt to make certain this is kept tight should stretching of short length, while the lower belt is of leather. A occur. Standard Ford generator ball bearings are used throughout for all rotating parts.

Maintenance Notes

Convenient Rack for Trolley Catchers

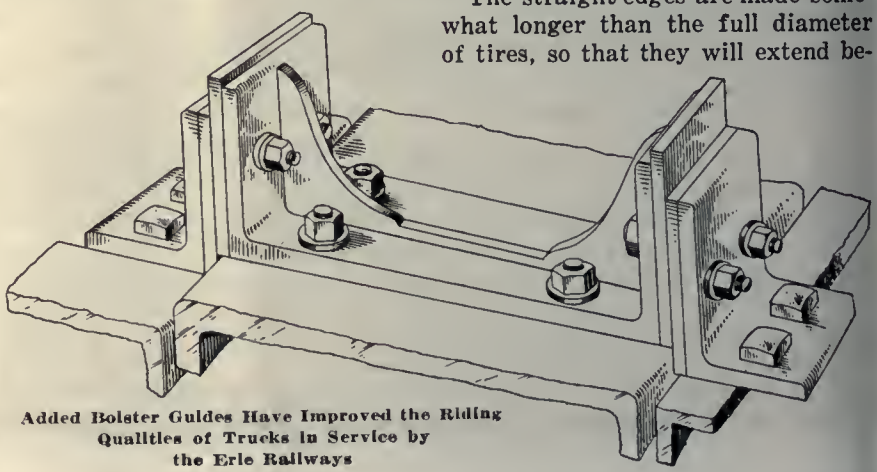
ORDERLY arrangement for the storage of trolley catchers being desirable, the Grand Rapids Railway, Grand Rapids, Mich., has provided each of its operating carhouses with a rack to hold the trolley catchers when they are not in service. This rack is made of 2 x 2 x ¼-in. steel angles. It has provision at the top for holding trolley catchers which are O. K. for service. A bin is installed at the bottom, in which bad order catchers are placed. These are removed from the cars and sent to the shop for repairs daily, being replaced by catchers in good condition.



Racks Are Provided at Each of the Carhouses of the Grand Rapids Railway for Storage of Trolley Catchers

Added Bolster Guides Improve Car Riding

WHEN a car stops there is a tendency for the truck bolster to tip forward. Likewise, when the car starts, due to the acceleration of the motors, the tendency is for the bolster to tip backward. Bolster guides are therefore subjected to a considerable strain which causes wear at each stopping and starting of the car. In order to provide additional bolster guide surface and to damp out the rocking tendency of truck bolsters, P. J. Wood, superintendent of equipment, Erie Railways, Erie, Pa., is adding two angle plates to the truck transom with two corresponding angle plates on the truck bolster at each side of the truck. These extend upward for a distance of 6 in. and are 8 in. wide. Hardened steel wearing plates are bolted to the faces of each of these angle supports and a clearance of 0.020 in. is allowed between the faces of the wearing plates coming together from the truck transom and bolster. The accompanying illustration shows the installation of these additional bolster guides on a Baldwin No. 77-18 K truck. Their use has produced a great improvement in the riding qualities of the truck and also prevents the tendency of other truck bolts to work loose.



Added Bolster Guides Have Improved the Riding Qualities of Trucks in Service by the Erie Railways

Gage Checks Alignment of Bus Wheels

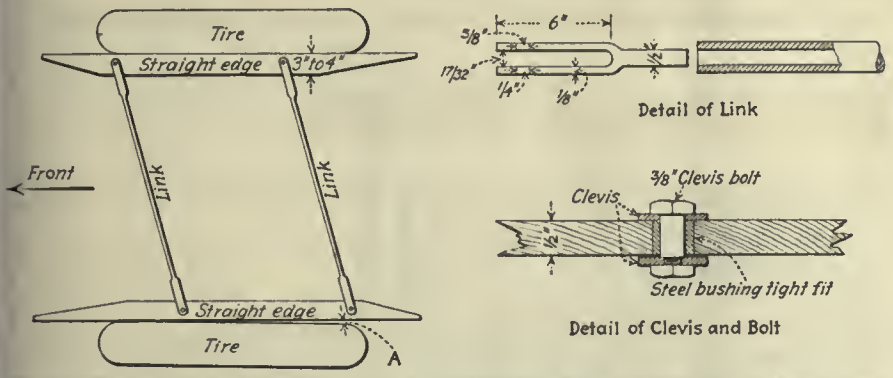
By F. J. Foote

Superintendent Motive Power and Equipment Columbus-Dayton Transportation Company, Springfield, Ohio

SAFETY and economy are never best served by tires that are improperly aligned. This is so by reason of the facts that difficult steering, an enemy to safety, and rapid tire wear, an enemy to economy, are caused by wheels that have too little or too much "toe-in." After trying many methods for determining wheel alignment, a gage was finally evolved in our shops that has proved satisfactory because of the accuracy and speed with which it can be used on certain models where ordinary gages cannot be used.

The principle used is that of the parallel ruler, which depends on the theorem that opposite sides of a parallelogram are always parallel. The gage consists of two thin hardwood straight edges connected at equidistant points with two links of equal length. If this device is accurately made the outer edges when parallel in any one position will be parallel in any other.

The straight edges are made somewhat longer than the full diameter of tires, so that they will extend be-



Wheel-Aligning Gage. Necessary "Toe-In" Is Indicated at *A* in Assembly Diagram. Link Is Composed of Two Clevises and Section of Pipe Riveted and Welded Together

yond the tires both ways. To use this gage one straight edge is held firmly against one tire as high up from the floor as possible (or against the rim if same projects beyond the tire), then the other straight edge is carefully moved out against the opposite tire (or rim). Unless the tires happen to be parallel this edge will touch the tire at one point only, while the other end of the straight edge will stand away from the tire a certain amount. As this measurement must necessarily be made at points below the wheel center, the amount that the straight edge stands away from the tire will be less than the amount of the toe-in. This is so because of the camber or "dish" of the wheels.

It has been found that the best method is to determine with as much accuracy as possible just what toe-in gives the best results, then select a bus whose wheels have the exact toe-in required, apply the parallel gage to the wheels, noting down the amount that the straight edge stands away from the tire at one side. This need be done only once, as the setting will then be the same for all time unless it is desired to change the size of tires or the toe-in.

After this gage is used a few times the mechanics will be able to judge the required opening between straight edge and tire by eye with sufficient accuracy so that a scale or other measuring device is unnecessary. In practical use it is always advisable to apply the gage in at least two or preferably three places around the tires, taking as the proper "toe-in" an average of the readings obtained to compensate for wheels or tires that do not run true.

This should be done with the full weight of the bus on the tires, and it is preferable to move the bus forward a short distance before each measurement in order to take the slack out of tie rod joints and other parts. Any good mechanic can build the gage, but great care should be exercised to get the bolt holes in the straight edges the same distance apart and the same distance from the working edges, also to get the bolt holes in the links the same distance apart. The bolts should be lathe turned with a very close fit in both links and straight edges so that there will be no lost motion.

As a final check for accuracy one straight edge should be placed on a level floor, the links held stationary in a nearly vertical position and the straight edges carefully checked for parallelism.

Drill Press Convenient for Truck Overhauling

DRILLING and grinding of various truck parts have been facilitated by a modern high-speed drill press and an emery wheel which have been installed in the truck overhauling shop of the Department of Street Railways, Detroit, Mich. This has been found of particular benefit



Drilling a Truck Hanger in the Overhauling Shops of the Department of Street Railways, Detroit

in saving workman's time, as otherwise the parts would need to be taken to the machine shop. Often the workman can finish the job completely in much less time than would be needed to have the parts carried to and returned from the machines in the machine shop.

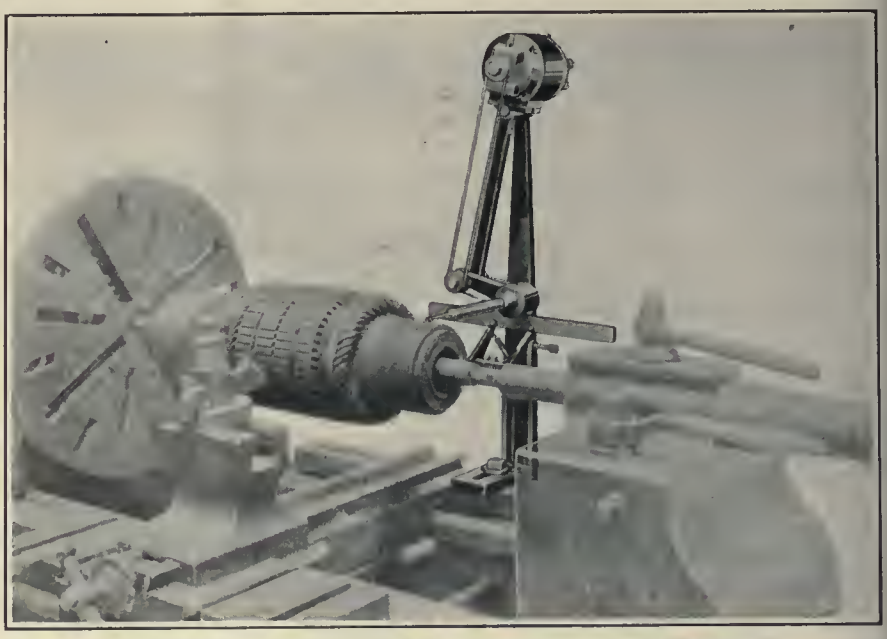
New Equipment Available

Commutator Slotting Attachment for Any Lathe

ONE of several types of commutator slotting devices recently put on the market by the Hullhorst Micro Tool Company, Toledo, Ohio, is a lathe type of particular interest to electric railway men. This is designed for attachment on any make of large lathe, and its simplicity of operation enables work of undercutting commutator mica to be done speedily and with ease. This particular type of machine, known as No. 9, is mounted on the lathe by attaching the slotted angle plate at the bottom to the lathe carriage. The main upright, which supports the mechanism, is held to this angle plate by two cap screws. Rough adjustment up and down to suit varying diameters of commutators is obtained by sliding the upright with the cap screws loosened.

For accurate adjustment of the depth to which slotting is to be done, a depth bar gage fits to the upright. The lower arm of the undercutter slides on this depth gage, which serves as a rest to insure accurate work. The slotting saw or cutter is driven by a small motor through belting. Motors are furnished for operation on either a.c., 60-cycle, 110-volt circuits or for d.c., 110-volt circuits. The motor is pivoted at the top of one swinging arm, and a pulley on the armature shaft provides for belting to a countershaft and from this to a pulley on the cutter spindle.

The cutter spindle is built into the lower arm of the machine. It has a tapering arbor ⅜ in. diameter at the cutter end. The spindle and arbor are made of crucible steel lapped into bronze bearings. The disk mica cutter is placed on a screw at the end of the arbor. It is a mill-cut precision made cutter, which mills out a clean smooth groove of uniform depth.



Slotting an Armature by Means of the Undercutting Machine Attached to a Lathe Carriage

In operation, the workman sets the cutter over the mica at the back end of the commutator and then pulls the handle toward him. Very little pressure is needed for cutting. When not in use, the swinging arms can be pushed up and the construction is such that they remain in the upward position out of the way, so that the lathe can be used for other work.

Portable Circular Saw

OF A size and character suitable for use in electric railway maintenance shops is a portable floor type circular saw for woodworking which has been developed by J. D. Wallace & Company, Chicago, Ill. It may be expected to relieve larger machines of considerable work so that both types can be operated to full capacity on the work for which they are best adapted.



New Circular Saw Suitable for Railway Use

The motor and all working parts are built into the upper portion with the table and fences. Thus the top part is a complete self-contained bench type saw when lifted off the regular stand. A constant-speed air-cooled motor is directly geared to the saw spindle, thus eliminating all belts and their attendant troubles. The electric motor operates on either the lighting or the power circuit. It is started and stopped by means of a toggle switch located on the motor itself.

A table of one-piece finished steel 25 in. x 25 in. and fitted with a removable throat piece is provided, so that special saws, dado and cope heads requiring a wider throat opening may be used. The machine is designed to handle the smallest and most delicate work with absolute accuracy and yet is sufficiently rugged to cut efficiently stock 2¾ in. in thickness.

To cut various angles the saw is tilted instead of the table and it is possible to cut at any angle up to 45 deg. with either ripping or cross-cutting saws by this tipping of the blade. Two cross-cut fences are provided so that right or left hand mitring up to 50 deg. can be done, the angle being indicated on a degree plate located on each fence. Provision is made for taking up any play, thus assuring accuracy. Both fences can be removed when not in use.

Association News & Discussions

Control of Inventories*

By W. F. Maher
Storekeeper United Electric Railways

FUNDAMENTAL principles of storekeeping require the keeping of records in two forms, namely, the control account and the unit record. The control account, known as general stores, material and supplies or some such term, simply reflects the aggregated valuation of material on hand at the closing of each accounting period. The unit, or individual card record, shows the quantity and value of each item, constituting the basis of perpetual inventory. While both the control account and individual record are essential, they do not provide a means of quick analysis when there is a substantial fluctuation of the inventory, an increase in inventory always being disturbing from a storekeeping standpoint unless there is a known reason for such increase.

To determine the cause of fluctuations and to maintain a better control of the inventory on account of the vast sum of money represented, it is necessary to equip the stores system of accounting with controllers, slack adjusters, shock absorbers and other protective devices as follows:

1. An annual physical inventory is taken.
2. A card is kept in each bin or location showing receipts, delivery and current balance.
3. A stock record card is kept showing on one side complete data embracing requisition number and date, order number and date, quantity ordered, received and billed, amount of invoice, unit cost and firm from which purchase was made, monthly disbursement and annual inventory. The reverse side provides for disbursement showing date of issues, department furnished, quantity and perpetual balance.
4. A maximum and minimum quantity is established, where practicable, which provides for unit control.
5. An actual count, where practicable, is made at each turnover before new stock is stored, at which time bin cards and stock records are checked and adjusted. With this method several physical inventories are obtained during the year.
6. A subdivision of stores by means of a logical grouping of material by classes.

When we arranged our classification of material we endeavored, where possible, to group in a class by itself material that in the ordinary course of events would be used by one department and chargeable to one operating account. This reasoning, of course, could not be applied to all material, as items such as bolts, nuts, screws, washers, etc., are used by all departments and chargeable to sundry operating accounts, so to cover these miscellaneous items a general division was incorporated. The classification consists of 42 classes divided into the following major divisions: (1) track; (2) line; (3) structures; (4) equipment; (5) power; (6) general; (7) scrap; (8) containers.

Receipts and disbursements are posted to the various classes: classes are balanced, and a stock report forwarded to the vice-president each month showing a summary of activities in each class for the month. A fluctuation in the inventory can be readily ascertained by an analysis of the various classes, and if fluctuation is due to seasonal requirements it will be evidenced in the classes affected.

The reduction of the inventory, of course, is to a large extent dependent upon the control we have of the inventory, one being very closely related to the other. In order to facilitate the reduction of our inventory by reducing our obsolete and slow moving stock, we have set up another classification which is used when the annual physical inventory is taken and material inventoried under the following captions: Class A—New material; Class B—New material, obsolete; Class C—New material, inactive; Class D—Partly worn material; Class E—Scrap. In this manner we gather under one head all new, but obsolete material. Under another, our inactive or slow moving items. We endeavor by letter to heads of departments and by personal interview to ascertain if this material cannot be used or substituted for material which would otherwise have to be purchased and representing an additional investment. If we find that there is no place on our property where this material can be used, a report is sent to the vice-president setting forth the name of the material and book valuation and he in turn refers the matter to the purchasing agent, who endeavors to find an outside market for such material. If there is no market for this material it is then scrapped, metals salvaged and sold under the competitive bid system.

COMING MEETINGS OF *Electric Railway and Allied Associations*

June 2-4—Canadian Electric Railway Association, annual convention, Quebec, Canada.

June 9-16—American Railway Association, Mechanical Division, annual convention, Atlantic City, N. J. Car matters, June 9-11; locomotive matters, June 14-16.

June 10-11—Advisory Council conference electric railway executives, Eastern region, starting 3 p.m. June 10, Engineering Societies Building, 29 West 39th Street, New York City.

June 21-25—American Society for Testing Materials, annual meeting, Haddon Hall, Atlantic City, N. J.

June 25-26—New York Electric Railway Association, annual meeting, Hotel Champlain, Bluff Point, N. Y.

June 28-July 2—Central Electric Railway Association, summer meeting, S. S. South American, Buffalo, N. Y., to Chicago, Ill.

July 8-10—Midwest Electric Railway Association, annual convention, Brown Palace Hotel, Denver, Colo.

August 12-13—Wisconsin Public Utility Association, Railway Section, La Crosse, Wis.

Oct. 4-8—American Electric Railway Association, annual convention and exhibits, Public Auditorium, Cleveland, Ohio.

Quantity Buying for Small Railways*

By A. B. Fuller
Purchasing Agent Union Street Railway, New Bedford, Mass.

QUANTITY or seasonal buying is undoubtedly practical on large properties where the turnover is rapid and large quantities of material are used, but in the case of small companies the financial saving is offset by two factors which must be considered, namely, depreciation of material and too long a tie-up of money. In general, small roads would do better to follow the hand-to-mouth policy.

The buyer is frequently offered opportunities to order supplies which will be delivered at hand-to-mouth intervals and invoiced accordingly and still take advantage of quantity prices. However, unless he is buying on a very large scale, the saving is insufficient to counteract the cost of the clerical work involved in taking care of the several contracts.

With stock now being carried almost at our door by the large supply houses and manufacturers, who are constantly striving to give better service, it seems no longer necessary to anticipate our standard material requirements two or three months in advance. The burden of carrying large stocks has been assumed by them and has made possible a great saving in interest on money which would otherwise be invested in supplies. For instance, we no longer find it necessary to buy our entire winter's supply of armature coils in the fall.

It is the policy of our company to take advantage of all discounts, both in buying and discounting of bills. The

*Abstract of a paper presented at a meeting of the New England Street Railway Club, Boston, Mass., May 6, 1926.

only disadvantage in this practice is that goods are very frequently paid for before they have been delivered, and if they are not satisfactory it is harder to adjust the matter than if the invoices had not been paid prior to the arrival of the goods.

Quotations are requested by us on purchases involving large amounts. No definite policy is followed in awarding contracts, but they are usually awarded in accordance with the best judgment of the purchasing agent, quality usually being of the greatest importance.

It seems to me that in the case of small roads, having no adequate testing facilities or no means of getting our specifications, it is much better to rely upon the manufacturer, who, it is safe to assume, knows more about the article he is producing than the buyer, whose only guide must be the manner in which the material fills his requirements.

We have found that, with our limited facilities and comparatively small requirements, goods can be purchased more cheaply than we can manufacture them. We confine our efforts in this direction to reclamation work and some small amount of manufacturing which is done in spare time.

	Material on Hand	Gross Earnings	Per Cent Ratio
1920.....	$83,998.68	$1,724,902.98	4.8
1921.....	69,907.41	1,600,018.55	4.3
1922.....	52,491.40	1,606,395.66	4.2
1923.....	57,730.46	1,634,286.60	3.5
1924.....	46,355.91	1,458,888.05	3.1
1925.....	46,071.10	1,422,630.71	3.2

We are fortunate in having our stock practically all under one roof and under the constant supervision of only two men. This has a tendency to keep the amount of supplies down to the minimum requirement, which eliminates the waste and unnecessary accumulation which is likely to occur on large properties, where the supplies are distributed over a large territory and they must be handled by a large number of men.

During the last six years we have reduced the amount of money invested in supplies about 40 per cent by means of these practices. An additional reduction has also been effected by immediately disposing of any obsolete material discovered in stock instead of carrying it from year to year, thinking we may use it some day, or depending upon inventory to bring it to light. In the rush of stock taking it is very likely to be overlooked.

The accompanying table shows the comparative ratio of supplies on hand to gross earnings of the Union Street Railway for a period of six years.

Central Electric Railway Master Mechanics Meet

FIFTY-ONE delegates attended the quarterly meeting of the Central Electric Railway Master Mechanics' Association which was held in Decatur, Ill., on May 13. E. B. Gunn, Wapakoneta, Ohio, superintendent of equipment for the Western Ohio Railway, presided in the absence of Pierre V. C. See, who was kept away from the meeting by strike conditions in Akron, Ohio.

J. D. Barnhart, superintendent of shops, Illinois Traction System, Decatur, entertained the delegates at a luncheon at the Hotel Orlando, and later the guests made a trip in the new buses of the Illinois Power & Light Corporation through the territory. The ride was arranged by courtesy of M. L. Harry, general manager of the corporation for the Decatur territory.

Interesting talks were made by J. S. Y. Frelich, district manager of the Westinghouse Traction Brake Company, on "Maintenance and Safety Features of Air Brakes," and by J. D. Barnhart, who opened a round-table discussion on public safety methods. The discussion on this latter subject brought out opinions that the electric railways are rapidly recovering from the temporary slump and are successfully combating the effect of the introduction of the automobile into the transportation field. E. J. Hoefler, technical representative of the Sherwin-Williams Paint Company, Cleveland, Ohio, discussed paints and lacquer systems.

The various representations from the different states were: Illinois, 24; Ohio, 13; Indiana, 10; Missouri, 2; Pennsylvania, 1, and Michigan, 1.

Standard Track Bolts and Nuts Proposed

PREPARATION of tentative standards for track bolts and nuts have recently been completed by sub-committee No. 4 of the sectional committee on standardization of bolts, nuts and rivet proportions of the American Engineering Standards Committee. These tentative standards are now being submitted to the sectional committee for discussion and approval, after which they will be sent to the sponsor bodies for their approval. The prepared standards are thus only in tentative form and are open for discussion and criticism by electric railways. Those interested in the new standard can obtain copies by addressing C. B. Le Page, assistant secretary American Society of Mechanical Engineers, 29 West 39th Street, New York, N. Y.

The sectional committee which is dealing with the standardization of bolts, nuts and rivet proportions consists of 49 men, representing twenty national organizations, among which is the American Electric Railway Engineering Association. The committee was organized in March, 1922, by the Society of Automotive Engineers and the American Society of Mechanical Engineers acting as joint sponsors, under the procedure of the American Engineering Standards Committee. Subcommittee No. 4, which has compiled the standard, includes representatives from the largest steam railroads in the United States, electric railways and the leading manufacturers of track bolts and nuts. Clarence W. Squier, associate editor ELECTRIC RAILWAY JOURNAL, represented the American Electric Railway Engineering Association and served as chairman of the sub-committee.

Two types of track bolts are submitted. These differ only in the shape of the neck, one neck being oval, while the other is elliptic. Nominal diameters over threads have been standardized so as to increase in steps of $\frac{1}{8}$ in. from $\frac{1}{2}$ to $1\frac{1}{4}$ in. A large majority of the railways and railroads now use the oval neck type, but a few of the larger systems have gone to the elliptic neck as it offers certain advantages in preventing turning of the bolts. Where a change from present types of bolts used by electric railways is necessary in order to comply with the new standard, it is considered advantageous to use the elliptic neck bolts.

The proposed standards for track bolt nuts include three types, square, hexagonal and the Ideal recessed. Dimensions are also standardized for common and treated nuts. The track bolts and nuts have either the American National Standard form or Harvey grip threads. They may be formed by cutting, drawing or rolling.

Buses Will Conserve Rail Investment, Says Reeves

DECLARING that the steam railroads and electric railways had always arisen to the occasion in providing transportation service demanded by the public, Alfred Reeves, general manager National Automobile Chamber of Commerce, in an address before the New York Electrical League luncheon, held at the Hotel Astor, April 29, gave it as his opinion that the transportation interests would take up bus operation with increasing enthusiasm.

"It is true," he said, "that the electric railways were far too late entering the bus field, just as some of the railroads have been slow in entering the truck field. However, I think we ought to consider that it is hard to get men to take up hurriedly any new form of transportation. I have the feeling that mass transportation in the big cities will be moved by trolleys and subways, but that those trolleys and subways can supplement their service by buses, and that in many cases it will be cheaper to install buses in new territories and in some places have them replace some of the non-paying trolley lines."

Mr. Reeves declared that while he had a profound respect for any statement made by L. F. Loree, president of the Delaware & Hudson Railroad, he could not wholly agree with the statement made by Mr. Loree in his address to the St. Louis Chamber of Commerce recently, when he expressed the opinion that the country could wipe off the books the $6,000,000,000 invested in electric street and interurban railroads because the automobile bus and truck had placed them in the discard as effectively as steam railroads had killed the stagecoach during the last century. "Studies carried on by the National Automobile Chamber of Commerce," he said, "have brought no such conclusion."

"Unfortunately," Mr. Reeves declared, "too many of the trolley and railroad men have adopted buses and trucks in self-defense, rather than with enthusiasm. Many even now would apparently be glad to see this development cut off by drastic legislation. To many of them this form of transportation is a stepchild and they are more interested in its death than in its development. Not all trolley or railway men have taken this attitude, however. We are, of course,

in favor of proper regulation of buses and trucks. We advocate limited weights and limited sizes, but naturally we oppose, as any would oppose who are interested in transportation, the passing of legislation that would have to throttle rather than encourage such form of service to the public. Public opinion, which is the final arbiter after all, will demand buses and trucks."

Co-operative Colleges to Convene in Cincinnati

COLLEGES and universities giving co-operative instruction in engineering, commerce, architecture and other subjects have formed an association to further this form of education. The association will hold its first annual meeting at the University of Cincinnati on June 14-15. It was here the co-operative system was originated by Dean Herman Schneider twenty years ago.

Under the co-operative plan the students spend alternate periods at the university and at work in industry. While one student is in school his alternate is receiving practical training in some factory or office, and vice versa. In this way both the school and the shop are always fully manned. The theory learned in the classroom is thus applied in industry, and the problems which arise in industry are brought to the classroom.

Practically all types of manufacturing and construction enterprises have been used successfully in the training of co-operative students during their outside work period. Transportation and commercial organizations have proved equally useful for the same purpose, and, more recently, co-operative relations have been established between the colleges and those industries in which art is a factor, such as jewelry, ceramic and textile works.

The students profit by an opportunity to study technical problems at first hand and by access to the best modern equipment. The firms have the benefit of the enthusiasm and the analytical point of view brought into their organizations by student employees who are frequently able to contribute more than the satisfactory completion of the day's work.

International Conference at Barcelona, Oct. 10-16

DATES for the next convention of the Union Internationale de Tramways de Chemins de fer d'Intéret Local et de Transports Publics Automobiles have been definitely fixed for Oct. 10-16, 1926. It will be held in Barcelona, Spain.

The program of the convention was published in ELECTRIC RAILWAY JOURNAL, Jan. 23, 1926, page 161.

Internationaler Verein Selects Copenhagen for 1927

COPENHAGEN will have the next convention of the Internationaler Strassenbahn und Kleinbahnverein, to be held in June, 1927. An invitation to meet in Copenhagen has been received from the authorities of that city and has been accepted. The last meeting of the association was in Budapest in 1925.

American Association News

American Executive Committee Meeting

Progress Reported on Convention Plans—Large Street Car Exhibit Expected—Special Car Report Completed—Second Advisory Council Conference Announced

PROGRESS in the work of various committees was reported to the executive committee of the American Association at a meetlng held at association headquarters on May 14. Publicity activity, national relations, plans for the coming Cleveland convention and the work of affiliated associations occupied attention during a busy morning session.

Under the heading of publicity, J. W. Welsh, executive secretary of the association, who outlined the work of the committee, reported that 70,000 booklets covering the Indiana and New York bus situation had been distributed throughout the country. In addition, more than 25,000 booklets containing the "daily dozen" recommended by Mr. Storrs and the address of Britton I. Budd delivered at the Indianapolis meeting of the Central Electric Railway Association have been distributed.

Increase in company membership from 736 to 741 was reported by J. H. Hanna, chairman of the membership committee. There also was an increase in individual membership from 1,022 to 1,060. This, according to report, represents a total increase of 204 individual members since last October. C. E. Morgan called attention to the reorganization of the Public Service Railway company section, which recently held a meeting at which approximately 200 were present.

PLANS FOR CLEVELAND CONVENTION

Progress on plans for the Cleveland convention was outlined by J. H. Alexander and F. C. J. Dell. At a meeting held in Cleveland a sub-committee of the exhibit committee approved a space diagram for the exhibit, which is being prepared for printing and distribution to the industry. The Cleveland convention committee held its first meeting recently and approved a form of contract with the association with some slight modifications. A special subcommittee consisting of C. E. Morgan, B. A. Hegeman, Jr., and C. R. Ellicott was appointed by President Coates with power to act on the contract before the next executive committee meeting. Tentative commitments for approximately 40 street car exhibits were reported. Plans are being made to intensively circulate the industry for the purpose of stimulating car exhibits during the convention. The matter of throwing the exhibition open to the public on one night during convention week was left in the hands of the Cleveland convention committee, together with the question of charging an admission fee for such public attendance. Tentative arrangements have been made with the Cleveland Orchestra to have it available for Tuesday night during the Advisory Council meeting if that plan fits in with the general convention program.

Friday afternoon and Saturday morning were designated by the executive committee as the proper time for visiting manufacturing plants in and around Cleveland. This plan was adopted in order to avoid having such inspection trips interfere with the program of the convention.

M. B. Lambert, Mr. Storrs and President Coates reported on the recent meeting of the U. S. Chamber of Commerce at Washington. Mr. Lambert pointed out that the Chamber of Commerce is becoming a leading spirit in guiding the destinies of American industry, and emphasized the importance of the chamber's work. He urged that railway executives become active in the chambers of commerce in their respective cities.

On the subject of national relations, C. L. Henry said that electric railways have been definitely exempted from the provisions of the railroad labor bill. He also said that according to the latest information available there has been no general hearing called on the question of the application of section 15a to electric railways, although a specific hearing in the case of the Interstate Public Service Company of Indiana has been set for May 25.

TO DESIGN ASSOCIATION FLAG

T. W. Casey, C. C. Peirce and H. C. Clark were designated as members of a special committee appointed to design an association flag. C. R. Ellicott was authorized to arrange for a special association booth in the convention hall for the sale of canes with an appropriate A.E.R.A. ribbon attached. A special donation of $1,000 to the American Engineering Standards Committee was approved. This is in addition to the regular dues, amounting to $1,000 annually, paid by the association.

An outline of the progress of work in the Engineering Association was given by C. R. Harte, president. This included work by the purchasing agents and storekeepers on the establishment of an obsolete material exchange. He secured authorization for the committee to send out a special questionnaire to obtain the sentiment of the industry regarding the establishment of such an exchange. Mr. Harte expressed the belief that the new procedure of approving standards by letter ballot would help to eliminate the tendency toward perfunctory approval and subsequent failure on the part of member companies to adhere to standards adopted. He emphasized the importance of the co-operative work done through the American Engineering Standards Committee.

The committee approved general let-

ters to be sent out by the association giving the conditions of a speed contest and public relations contest under the auspices of *Electric Traction* and *Forbes Magazine*, respectively.

J. H. Hanna reported the consummation of arrangements with L. R. Nash to take over the work on depreciation formerly handled by Mr. Maltbie. E. F. Wickwire, speaking on the program of the committee on co-operation with manufacturers, said that the committee had decided to make its principal work for the present that of furthering interest in traffic congestion relief. Arrangements have been made to print the address of President Coates at the United States Chamber of Commerce meeting for distribution to all manufacturing members of the association.

Edward Dana, chairman of the committee on education, said that his committee is co-operating with the committee on management and operation. Arrangements are being made to hold a typical foreman conference during the Cleveland convention. Two men from each of seven widely distributed companies will take part.

Report on Improving Cars Completed

For the committee on management and operation, G. C. Hecker of the association staff reported general activity and announced that approximately 900 copies of the book on modern methods and practices had been sold. Mr. Hecker also reported completion of its report by the special manufacturers' engineering committee which has been studying the question of improving car design and reducing the number of types of cars which are required by the industry. This report was turned over to Mr. Storrs pending appointment of a committee of manufacturers' executives to take charge of various phases of a general campaign looking to the improvement of electric railway rolling stock. In a brief abstract of its work the committee indicated that it had made a study of various recent car types submitted by manufacturers, and had reached the conclusion that the large variety of designs required in the past has prevented manufacturing economies from being accomplished. It was the opinion of the committee that agreement on the basic features of design would permit approach by manufacturers to a quantity production basis through elimination of needless variations in dimensions, weight and general arrangement.

As a basis for agreement on fundamental features the committee submitted plans of a city and an interurban car. These are intended to show that cars of the general types indicated may be adapted to meet conditions on various properties. Either car may be arranged for one-man, two-man or combination one-man two-man operation. The designs are also adaptable for single or double-end service and for various seating capacities. It was the intention of the committee to provide for increased size by lengthening the body in window sections. Only three standard sized motors, namely, 25, 35 and 40 hp., are considered necessary under average conditions. Twenty-six-inch diameter wheels were recommended.

It was pointed out that the designs submitted may be equipped with any known specialty or safety devices and that in adhering to the recommendations, manufacturers are in no way limited in developing a distinctive product; that ingenuity may be fully exercised in the design of structural details to reduce weight and that features to add comfort and attractiveness to passengers are optional with the individual builders. The committee recommended prompt publication and distribution of the report. It also urged that a referendum of the industry on the proposed cars be made to give a definite idea of the extent to which the recommendations may be made effective on various properties.

Modern Cars Earn 13 To 65 per Cent

Part 2 of the report contains experience data on eight properties where modern light-weight cars have been installed. Returns on the investment based on savings in equipment maintenance, power and platform labor range from 13 to 65 per cent. Some properties also showed a gratifying gain in gross revenue, indicating that attractive new cars are important factors in stimulating traffic. A bibliography of articles appearing in the technical press on advantages of new cars is included in the report. In Part III interesting data concerning the purchase of cars since 1907 and a summarized statement of the age of equipment in service by five-year periods as compiled by ELECTRIC RAILWAY JOURNAL is presented. From an analysis of these figures the committee concludes that there are 25,000 cars in the industry that are more than twenty years old.

A nominating committee for the officers of the association and five directors—two railway and three manufacturers—was named by President Coates and approved by the executive committee pending acceptance. A resolution on the death of Randall Morgan prepared by a special committee, of which Mr. Shannahan was chairman, was read by Mr. Welsh.

Regional Conference Announced

Mr. Storrs announced a regional conference under the auspices of the Advisory Council for the Eastern territory, similar to that held in Chicago. This meeting will be at the Engineering Societies Building in New York City on June 10 and 11.

An invitation from Barron Collier to hold the next executive committee meeting on board his yacht on the Hudson was accepted. The yacht will leave the dock at 79th Street and the Hudson River promptly at 10 a.m. daylight saving time on July 30.

Those present at the meeting were as follows: F. R. Coates, R. P. Stevens, Barron Collier, L. S. Storrs, C. R. Harte, J. H. Hanna, H. B. Flowers, E. F. Wickwire, W. S. Hammond representing C. S. Hawley, C. E. Morgan, E. P. Waller, B. A. Hegeman, Jr., T. A. Kenney, M. B. Lambert, S. J. Cotsworth, C. R. Ellicott, J. W. Welsh, C. L. Henry, Edward Dana, F. W. Doolittle, G. C. Hecker, L. H. Palmer and J. H. Alexander.

Advisory Council to Hold New York Meeting

FOLLOWING a meeting of the Advisory Council of the American Electric Railway Association on the morning of Thursday, June 10, a general regional conference of executives will be held. This will be similar to the one held in Chicago last February for those in the central region. Invitations are being sent out to executives of electric railways in the eastern part of the country. The conference will convene at 3 p.m. on Thursday and will continue through Friday.

Matters of great importance to the industry as a whole and to each of the individual companies will be discussed by those actively engaged in directing the affairs of these companies.

A.E.R.A. Elects Members

NINE applicants for company and associate membership and 46 for individual membership were elected at the meeting of the executive committee of the American Electric Railway Association held on May 14. Following are the new company and associate members:

Operating

Anglo Argentine Tramways Company, Ltd., Buenos Aires, Argentina.

Associate

Ross W. Harris, consulting engineer, Madison, Wis.

Manufacturer

American Malleable Castings Association, Cleveland, Ohio.

Baltimore Copper Smelting & Rolling Company, Baltimore, Md.

DeVilbiss Company, Toledo, Ohio.

R. Roy Holden, Chicago, Ill.

Larkin Company, Inc., Buffalo, N. Y.

Martindale Electric Company, Cleveland, Ohio.

Railway Materials Corporation, Toledo, Ohio.

Bus Operation

ELIMINATION of a number of subjects from the list which the committee on bus operation will present in its final report marked a meeting held at association headquarters, New York, on May 20. Customer ownership of stock in bus companies and methods of buying tires were among the subjects dropped.

Advantages of establishing differential rates for chartered bus service, depending on the need for the equipment in regular service at that time, were outlined. Types of equipment with reference to their suitability for various classes of service were discussed. Gas-electrics received particular consideration. Possibilities of carrying packages, trunks, mail, etc., by bus were commented upon.

Determination of fares and the problem of non-paying lines were discussed at considerable length. The advantages of having the bus operating company carry its own insurance were brought out.

Members present were J. B. Stewart, Jr., chairman; V. W. Berry, E. D. Dreyfus, Adrian Hughes, Jr., R. N. Graham, S. W. Greenland, Alexander Shapiro, C. D. Smith and R. H. Smith.

The News of the Industry

Governor Against New Haven Control Bill

Governor Fuller returned to the Massachusetts Legislature on May 13 a bill petitioning the right of the New Haven road to acquire the securities and property of the New England Investment & Security Company. In so doing the Governor has halted, at least for the time being, the plan announced recently by the New Haven company for rehabilitating the Springfield Street Railway and the Worcester Consolidated Street Railway, properties which the New Haven planned to reconstruct if acquired under the provisions of the bill.

In returning the bill the Governor authorized the statement that it seemed best for the public welfare to keep these two large street transportation systems free from railroad control. He further recommended that an amendment be added to the bill providing that all towns and cities served by these two transportation companies shall vote on the project of consolidation with the New Haven interests.

If these amendments were adopted, it was pointed out, not only the New Haven Railroad, but the cities of Springfield and Worcester as well would be at the mercy of the smallest town now served by either the Springfield or Worcester company. If the Board of Selectmen in any town, for political or other purposes, decided to force the railroad company to build an unprofitable extension, it would have the power, under the proposed amendments, to prevent the carrying out of the railroad's plan to spend more than $1,000,000 in improving street railway transportation in Springfield and a similar amount in Worcester.

In the form in which the measure went before the Governor the bill represented the result of more than three months of study on the part of the railroad committee of the Legislature. It embodied an agreement on the part of every interest, including the stockholders and bondholders of the railroad and of each of its subsidiary companies, and also of the officials of both Springfield and Worcester.

Notwithstanding these apparently very unfavorable developments, events took a turn at the last moment that may result in saving the legislation. After the bill had been held up by Governor Fuller and returned to the State Senate with suggestions and amendments that approval of the bill be subject not only to the city councils of Springfield and Worcester but also all other municipalities sharing the service of the two trolley companies, conferences concerning this change were held and were attended by Charles H. Beckwith, City Solicitor of Springfield; Senator George J. Chamberlain, Springfield; Mayor O'Hara and Senator Nelson, Worcester; Senator Look for the railroad committee, and George L. Barnes for the New York, New Haven & Hartford Railroad. Compromise was sought regarding the amendment. It was suggested that a majority of the other municipalities should suffice. Governor Fuller was willing to let it go if four-fifths of the cities and towns agreed. Later it was agreed by both parties that three-fourths of the municipalities served by the companies must accept the provisions before the railroad can proceed with its development plans.

It would appear now that this amendment is quite certain to pass both houses of the Legislature. It is found that the Worcester and the Springfield trolley lines serve 49 cities and towns, which means that the plan will become operative unless vetoed by thirteen of these municipalities.

Mayor Fordis C. Parker of Springfield did not favor the amendment to the bill. He let it be known that the superlative interest in the development lay with Springfield and Worcester. To him it did not seem right to make it possible for a group of small towns to hold the matter up.

Bills for Track Removal in New York Approved

A bill approved on April 16 authorizes the city of New York, with the approval of the Transit Commission, to acquire by condemnation the right to remove the street railway tracks from Central Park West and Eighth Avenue, between 59th Street and 116th Street, the cost of such removal to be divided between the city and the owners of the property benefited thereby. The removal of these tracks would cut the Eighth Avenue Railway in two, but it is expected that the large damages which would be awarded the company in the courts will discourage the city from undertaking this plan. Moreover, the difficulties of determining the extent of the benefits to be derived by adjoining realty would be great. The act is permissive only and the best informed do not believe the city will take advantage of the powers conferred by it. A somewhat similar act authorizes the city of New York to remove the street surface railway tracks from East 59th Street between westerly lines of Second and First Avenues, Manhattan.

One-Man Cars in Downtown Milwaukee

State Commission Permits Test for Six Months—Cars to Be Painted Different from Others—More Cars Recommended for Use in Regular Service

THE long-heralded order permitting the installation of one-man cars by the Milwaukee Electric Railway & Light Company, Milwaukee, Wis., on its Walnut Street line has finally been issued in favor of the company by the Wisconsin Railroad Commission. The new service will start on May 23. Instead of being permanent in character there will be a six months trial or test period, inasmuch as it will be the first one-man car line to run through the downtown section. All the other similar lines serve outlying sections.

The operation of one-man cars will result in more frequent service. The twelve cars now operated in the morning will be increased to sixteen and the sixteen now operated in the afternoon will be increased to 21. The same number of extra trains in rush periods will be provided as heretofore on this line. Because of their sole use in the downtown section the new cars will be painted a brilliant orange with a white band of cream around them in order that they may be easily distinguished from the yellow two-man cars. They will be the first city cars to be equipped with imitation gray suede seats.

The commission's order was the climax of many months of argument, in which city officials, civic organizations and patrons of the line opposed the extension of this type of car through the downtown area.

Coupled with its one-man car order, the commission also made public the results of its extensive report covering a general survey of railway service conditions in Milwaukee. It is one of the most comprehensive reports ever issued by the commission and represents a study of service conditions throughout the city for the past several months. This report will be made the basis of another hearing. Some of the commission's recommendations for providing more dependable and frequent service throughout the city were:

That 70 or 75 additional cars be purchased and placed in service, 21 to take care of inadequacies shown in the check of service, 24 to fill in because two-car trains fail to carry the loads at which they are estimated in the specifications, fourteen to provide additional service beyond turnback points on nine or ten lines, five to allow for cars in shops for repairs and a margin of six to ten cars to allow for readjustments in schedules which the dispatcher foresees will be necessary to allow greater running time on some lines. The report further recommended the double-tracking or extension of the Mitchell, Burnham, Eighth Street and Oakland Avenue lines.

The commission found that single cars handled the crowds faster and moved more rapidly than the two-car trains.

Other recommendations made by the commission were that safety zones be lengthened to permit several cars to load, particularly where traffic is regulated by automatic signals, and that action be taken to stop the practice of automobiles parking so close to street car intersections as to interfere with the loading and unloading of passengers.

Coffin Award for Another Insull Property

The largest metropolitan electric lighting and power system in America received the 1926 Coffin award for meritorious public service when at the N.E.L.A. convention at Atlantic City during the week ended May 22, this distinction was bestowed upon the Commonwealth Edison Company, Chicago. Customer ownership, public relations, commercial activities, engineering developments and industry co-operation were some aspects of service in which the company was held to excel.

The Commonwealth Edison Company has more than 850,000 customers, a generating capacity of nearly 900,000 kva. and during 1925 produced more than 3,000,000,000 kw.-hr. of energy.

One Big Union at Winnipeg Seeks Government Aid

The one big union unit of street car men at Winnipeg, Man., has applied to the Dominion government for a board of conciliation, under the industrial disputes act, to investigate the situation which has arisen due to the actions of the Winnipeg Electric Company in refusing to negotiate an agreement with the one big union unit.

The company has signed an agreement with the Amalgamated Association, Division 99, granting an increase in pay of 1½ cents an hour to one-man car operators and an increase of 6½ cents an hour to bus operators, putting both these employees on the same wage basis.

The previous agreement of the company with its men was signed in 1922 between the company and a committee representing the motormen and conductors, but during the past twelve months the "One Big Union," which is a communistic organization, has obtained control of this committee. When the agreement expired on April 30 the company took the stand that it would not negotiate an agreement with any body of men whose affairs were controlled or whose actions were influenced by the one big union. If the men will eliminate O. B. U. influence the company will grant them the same agreement the Amalgamated has obtained.

This, in brief, was the situation on May 18. Up to May 21 there had been no further developments, but there appeared to be a possibility of the government appointing a board of conciliation during the week commencing May 24.

The company employs about 900 men on 115 miles of road.

Month's Delay in Albany Fare Case

A hearing was held by the Public Service Commission on May 14 at which the United Traction Company submitted valuation figures in the matter of its application for a 10-cent fare or thirteen tokens for $1 as an increase over the present 7-cent fare. A delay of one month has been granted by the Public Service Commission to enable the city of Albany, N. Y., to study the figures submitted by the company. In the interval a separate hearing will be granted on the Troy situation and the commission will pass on the arguments made by Troy that the commission is powerless to grant increases in fare on the company's lines in Troy because of a law passed by the Legislature designated to limit Troy fares to that specified in franchises granted by the city.

James B. McMartin, chief engineer of the Delaware & Hudson Railroad, who supervised the making of the United Traction Company inventory, testified that the values indicated were of Dec. 31, 1925. He gave the final value of the entire United Traction plant, the cost to reproduce it as of Dec. 31, 1925, as $18,350,374. The cost of the company's Albany plant is estimated at $5,035,352. Figures for some of the other communities follow: Rensselaer, $261,188; Menands, $231,946; Colonie, $71,510; Watervliet, $1,103,867; Waterford (town), $164,978; Waterford (village), $93,919; Cohoes, $706,261; Green Island, $280,885; Troy, $3,597,404.

Municipal Men Seek Wage Change

Employees Want Scale Calling for 7 Cents an Hour More than that Now in Force—Full Statement of Demands as Presented

EMPLOYEES of the local Department of Street Railways at Detroit, Mich., have requested a conference with department officials on a proposed new wage schedule calling for a general increase of 7 cents an hour for platform employees. The new wage schedules include for the first time carhouse employees, embracing car sweepers, washers and pit repair men. The demands were presented by a committee representing Local No. 26 of the Amalgamated Association. The present wage agreement expires on June 1.

Exceptions to the flat increase of 7 cents an hour are made in the cases of the platform employees for the first six months of service, who are scheduled to receive an increase of 5 cents an hour; for the second six months, an increase of 6 cents an hour is provided, and for one-man car and motor coach operators and owl car and snowplow platform operators an increase of 5 cents an hour is proposed. The new schedules provide the following rates:

	Cents an Hour
First six months	70
Second six months	75
Thereafter	80
One-man car and motor coach operators	85
Owl car men	88
Overtime	$1.00
Overtime for one-man car and motor coach operators	$1.05
Snow plow service	$1.00
Minimum platform men's wage	$80.00 a month
Instructors, 50 cents a day in addition to regular wages.	

The schedules for the new services covered by the union scale were announced as follows:

	Cents an Hour
Construction car platform men	80
Laborers in construction yard	62
Yardmen, carhouse men sweepers	62
Pitmen	82
Pitmen's helpers, first six months	67
Thereafter	72
Controller men	87
General repair men	82
Fare box men	$185.00 a month
Pump men	$185.00 a month
Janitors	62
Watchmen	62
Station cashiers	$155.00 a month
Garage repair men	87
Garage helpers	80
Coach cleaners	62

The schedule committee wants a revision of schedules which would shorten the working day by the time between runs when the men are idle. Schedules are desired giving the men as nearly as possible straight working hours without split runs. It is suggested that on scheduled runs where the time is in excess of eleven hours, platform men shall be paid 25 per cent more than the regular wage for the first hour and 50 per cent more for the second and third hours. No run is to exceed fourteen hours.

Tripper Runs a Problem

Runs less than six hours in duration are to be considered tripper runs and are to be paid at actual platform time except that no tripper run shall be less than two hours. The number of tripper runs is limited to 5 per cent of each given schedule.

It is provided that in case any electric line is motorized, the men employed on the line shall be placed on other lines without loss of seniority rights.

Regular men whose runs terminate after midnight are not to be asked to report the next day before 10 a.m.

The regular rate for an eight-hour day is to be deducted for absence. Other provisions include a seven-day vacation with pay every year after the first six months' service, and a ten-day vacation every year for fare box men, with every second Sunday off. Station cashiers are to be allowed ten days' vacation a year with every third Sunday off.

A statement attributed to officials of the local division of the union says D.S.R. platform men are 99 per cent unionized. Car sweepers, pitmen, car washers and carhouse employees have been invited to meet a committee appointed to discuss wages and working conditions intended to apply to the platform employees.

Aside from fixing wages the agreement provides that in case of grievances and disputes platform men are to be permitted to be represented in hearings by the representative or representatives of the employees chosen by the associated employees. This term "associated employees" is used by the men to designate their union.

Richmond Franchise Adopted

Without a dissenting vote and with no material amendments which affect the future operation of the Virginia Electric & Power Company, the proposed blanket traction franchise has been adopted by the Richmond Common Council just as it came from the streets committee with the approval of that body. It is probable a special meeting of the Board of Aldermen will be called to dispose of the measure.

The franchise is acceptable to the Virginia Electric & Power Company. That company's "surrender instrument" was read and approved by the Council. The instrument recites the manner in which the company's property is to be transferred to any other company that may obtain the franchise when it is offered for sale. It is to surrender all existing franchises and is required to sell to the purchaser its property at a valuation fixed at $9,491,084, slightly less than the amount allowed by the State Corporation Commission when that body fixed the present rate of fare.

The company, under the provisions of the franchise, is to pay upon its gross receipts as a tax, a certain sum, beginning with 5 per cent and gradually dropping annually until within ten years such tax shall amount to 3 per cent, at which figure it is to remain until the expiration of the franchise. It is also to pay for paving between its tracks and 2 ft., on each side, and agrees to turn over to the city any of its viaducts within a period of five years at no cost to the city. Permission is given the company to extend its service in several directions by the laying of new tracks and to augment its present fleet of passenger buses. The company may at some future date be required to install an underground system on Board Street, and it was provided that the city might, whenever the necessity arises, require the removal of the one-man cars.

A $1,500,000 improvement program is planned for this city by the Virginia Electric & Power Company. Fifteen passenger buses will be added to the present fleet and fifteen new street cars, representing an outlay of $200,000, have arrived in Richmond to augment those already in operation.

Akron Interurban Service Under Way

Interurban cars are now running between Akron and Massillon on the Northern Ohio Power & Light Company system. The first interurban car started between Canton and Massillon on May 18. Massillon officials dug up a twenty-year-old ordinance which provided that interurban men must have nine days training in the city before they could operate cars in the city. Some crews operating cars were arrested, but the company kept on operating.

The first serious strike disorders in Akron occurred on May 20, when the Northern Ohio Power & Light Company began interurban operation between Canton and Akron. Strikers smashed windows in nine Canton city cars and tried to wreck an interurban mail train near North Canton. The company obtained a temporary injunction in the federal court of Cleveland against Patrick J. O'Brien, vice-president of the Amalgamated Local. Federal officials are also planning to take action against men involved in the attempted wreck of the mail train. Despite disturbances, the interurban cars kept fairly well on hourly schedules during the day. At night the interurbans are shut down.

The union men admit their cause is lost in Akron and Canton, but pin their hope to the Akron-Cleveland interurban. They declare that is the division upon which they hope to win. Just when the company plans to open its Akron-Cleveland line has not been fully determined. No early attempts will be made to operate cars in Massillon. The company had applied to the city before the strike for permission to abandon its city system. The company is in no hurry to operate its interurban line south of Massillon for the reason that the line has been losing money for years. Arrangements have been made with other operators for the establishment of a bus line in that territory.

Edward McMorrow, who has been handling the strike situation for the Amalgamated, has been replaced by P. J. O'Brien, another vice-president.

Franchise Agreement Defeated in Omaha

Citizens of Omaha, Neb., by a vote of about 5,000 at the election held on May 13 defeated the proposed franchise agreement between the city of Omaha and the Omaha & Council Bluffs Street Railway. The ordinance covering the new agreement was passed by the City Council on March 30. It provided for neither an exclusive nor perpetual grant as to buses or street railway system or both. Right was reserved to the city to acquire the property and take over its operation.

For a number of years there has existed between the city of Omaha and the Omaha & Council Bluffs Street Railway a difference of opinion as to the duration of the company's principal franchise in Omaha. The city contended that this franchise expired in 1928, while the company was advised by its attorney that the franchise was perpetual. The city further held that the company's right to make extensions had already expired. With this uncertainty regarding the matter everything was at a standstill and would have to remain so until there was an adjudication by the courts or until the question was disposed of in some other way. After careful consideration the company decided that it would be far better, both from the standpoint of the city and from the standpoint of the company, to negotiate for a new franchise rather than to litigate the matter.

Rates Reduced on Massachusetts Line

The Atlantic Improvement Association, Atlantic, Mass., has won its fight for reduced fare rates in the Squantum-Atlantic section from the Eastern Massachusetts Street Railway.

The Improvement association, representing citizens of the town and headed by Joseph M. Goode, Jr., objected to the 10-cent fare rate in Atlantic. The railway did issue a commutation fifteen-ride ticket for $1, or 0.0667 cents per ride. This ticket, however, could not be used in the Atlantic-Squantum district.

The board of trustees voted to make fares on the Squantum line from the end of the line at Squantum to Atlantic depot, 10 cents cash or one punch on the Quincy fifteen for $1 ticket. From the end of the Squantum line to Quincy Square 15 cents cash with a free transfer privilege at Atlantic Depot, or two punches on the fifteen for $1 ticket, one punch to be made between Squantum and Atlantic Depot and another punch between Atlantic Depot and Quincy Square. The cash fare between the end of the line at Squantum and Neponset will be still 19 cents, with a free transfer at Atlantic Depot.

Suggestions by Chicago Railways to Be Received

Chicago is about ready to listen to the proposals for a franchise settlement made by Surface Lines officials and the seven committees representing the security holders. The ordinance which has been under consideration by the committee on local transportation of the City Council reflects the attitude of the city alone.

It is understood that when all the differences are ironed out, a new ordinance will be drafted and submitted to the voters next November.

The report of the Citizens' Advisory Subway Committee, which was appointed to induce downtown property owners to agree to voluntary assessments to pay the cost of a proposed subway, is expected in the next few days. Practically 80 per cent of the property owners in the Loop district, it is stated, have already signified their willingness to stand assessment for this purpose.

Assurance has been received from Major R. F. Kelker, Jr., the committee's engineer, that the technical parts of the separate ordinance for the subway lines will be completed in about four months. The question of unification of elevated, surface and subway lines will be taken up after the terms of the surface and elevated ordinances have been arranged.

Rather than accept the $152,500,000 which was represented as the valuation of the Surface Lines in the traction ordinance defeated last year, or any other previous estimate, the committee has decided to leave the question open until officials of the company can present their position. The committee approved and inserted in the tentative ordinance, however, the present requirement that the companies set aside 8 per cent of their gross income for a depreciation and renewal fund.

Objection has been expressed in committee sessions to the suggestion that the companies be relieved from the obligation to pave and clean the part of the streets occupied by their tracks, but no definite agreement has been reached on this.

Talk of subways has been revived by the incorporation of the Chicago Tube Transit Company by W. J. Newman and associates.

New York's Governor Approves Thayer Bill

Governor Smith of New York has signed the Thayer bill as chapter 846 of the laws of 1926 amending subdivision two of section 54 of the public service commission law, in relation to the purchase and holding by a corporation, organized under and pursuant to the provisions of the transportation corporations law, of the capital stock of another corporation so organized.

The public service commission law now provides that no railroad corporation, street railroad corporation or electrical corporation, domestic or foreign, shall hereafter purchase or acquire, take or hold any part of the capital stock of any railroad corporation or street railroad corporation or other common carrier organized or existing under or by virtue of the laws of this state, unless authorized so to do by the commission empowered by this chapter to give such consent.

It further provides that no stock corporation of any description, domestic or foreign, other than a railroad corporation, or a street railroad corporation, shall purchase or acquire, take or hold more than 10 per cent of the total capital stock issued by any railroad corporation or street railroad corporation or other common carrier, organized or existing under or by virtue of the laws of New York state.

In his memorandum approving the bill Governor Smith said:

> This bill proposes to include corporations which own or operate a stage, omnibus or other vehicle line or route which is now under the jurisdiction of either the Public Service Commission or the Transit Commission.
>
> When the original public service commission law was enacted, motor-driven stages and buses were not in common use. Today they are gradually being accepted as the modern means of transportation both inside and outside of our large cities, and should, therefore, be brought under the control and regulation of the Public Service Commission.
>
> For the above reasons the bill is approved.

Survey and Bus Extensions in Sacramento Planned

The Pacific Gas & Electric Company recently began a survey of its Sacramento, Cal., railway service for the purpose of submitting a definite plan of bus line extensions based on a 7-cent fare. This action was agreed upon between Councilmen and heads of the company. It is said that the company officials, even if they are successful in securing fares, are unwilling to consider railway extensions.

Wigginton E. Cress, president of the company, said he blamed the automobiles for the failure of the company to make the street railway business a paying venture. He said his company was losing money, but it was willing, as an experiment, to try the buses further, provided it could obtain additional revenue. He said he was not at all certain that an increase in fares would solve the problem.

The car and bus miles operated in 1925 were less than in 1920, being 3,233,015 in 1925 and 3,320,454 in 1920. The company had charts to show that revenues were $13,000 less last year than in 1924, but gross expenses were cut about $47,000. If the company's plans meet with the approval of the city authorities they say they will back the company before the Railroad Commission in an attempt to secure higher fares.

Franchise in St. Louis About Ready to Be Discussed

The service-at-cost ordinance for the St. Louis Public Service Company, which will succeed the United Railways, St. Louis, Mo., when the property of the latter company is sold under foreclosure proceedings, will be presented by Mayor Victor J. Miller for public discussion within the next few weeks. A vote of the people on the grant will be brought about through the initiative provisions of the city charter.

Mayor Miller and the railway men have agreed on a plan which will give the city arbitrary authority to order extensions and to specify the character of the service so long as a fare is provided which will enable the company to pay operating expenses and earn a fair return upon the property valuation. The valuation and rate of the return will be fixed in the ordinance.

Substitution Bill Signed by Governor Smith

Governor Smith of New York on May 18 approved the Messer bill as chapter 840 of the laws of 1926 amending the public service commission law by adding a new section 50-a, authorizing the commission after a hearing to permit the substitution of buses for cars on tracks on street surface or other railroad route.

Railway-Bus Proposal for Washington Cities

The City Commission of Chehalis, Wash., has received application from Earl B. Mills, Chehalis, and W. E. Bingham, Centralia, for a franchise for a railway bus system, with gasoline-propelled cars, to be operated on designated Chehalis streets, providing a fifteen-minute round-trip service in that city. The two applicants have also filed a petition with the State Department of Public Works, asking for a franchise in Centralia and also to connect this proposed service between Chehalis and Centralia, the whole making a one-hour round-trip service. Should all franchises be secured, Messrs. Mills and Bingham plan to put four twenty-passenger buses into service, which would give a fifteen-minute service between the Twin Cities. Local fare in Chehalis and Centralia would be 5 cents, with a 15-cent fare from any point in either city to any point on the regular traveled route in the other city. Fare between city limits would be 10 cents. Term of franchises for Chehalis and Centralia is proposed to be twenty years. Pay-as-you-enter cars will be operated.

Mayor West of Chehalis does not favor granting such a franchise. He calls attention to the fact that there is now a half-hour electric interurban service between the two cities, with railroad service at various times during the day, and that the interurban cars rarely carry any great number of passengers on a single trip.

Wage Negotiations to Be Taken Up at Toledo

Negotiations between the Community Traction Company, Toledo, Ohio, and the street car men's union over a new wage scale and revised working conditions will be taken up in the next fortnight. The present contract expires on May 13.

The present scale is 55 cents for all workers in service more than a year, 52 cents for those in service nine months and 50 cents for beginners. Bus drivers and operators of one-man equipment receive an additional 5 cents an hour.

No official announcement has been made but it is understood the men will ask an increase of 10 cents an hour.

Another Wage Proposal to Be Presented to New York State Men

Negotiations are to be reopened between representatives of the New York State Railways and the union with another proposal to be presented to the employees operating in Rochester, Syracuse and Utica. This is the next step following the joint vote on May 11 in which the men rejected the offer by the company for a wage and working agreement retroactive to May 1. This action on the part of the men was referred to in the ELECTRIC RAILWAY JOURNAL, issue of May 15, page 861. Polls were conducted simultaneously in the three cities. Walter F. Norton, business agent at Rochester, where the vote was tabulated, would not reveal the vote figures. The terms which the workers voted down failed to provide for any increase in wages, but made some concessions to the men in working conditions.

The present scale which the company wishes to renew calls for 55 cents an hour for members of city crews, 57 cents for interurban operators and 60 cents for bus and one-man car employees. The Rochester union members were out strongest for the wage increase, primarily because the railway put a 1-cent fare advance into effect there on Jan. 1.

It is hoped that the matter may be settled without resorting to arbitration. Magnus Sinclair, international organizer, said there was absolutely no possibility of strike action.

Census of Chicago Loop

People in the downtown district of Chicago, Ill., were waylaid at every turn on May 12 by representatives of the Chicago Association of Commerce and asked to indicate what form of transportation they used in covering the distance from their homes that day. In banks, retaurants and office buildings similar questions were tabulated on cards. Of those persons arriving in automobiles, the tally markers wished to know whether the machine was driven by a chauffeur and where it was parked. The census is a part of the metropolitan street traffic survey now being conducted by the Asociation of Commerce with a view to showing how many persons come into the "Loop" district daily and how street congestion may be reduced.

Extension of Time Under New York Electrification Bill

Governor Smith of New York on May 18 signed the Senate rules committee bill amending the Public Service Commission law by authorizing the commission after a hearing to extend for not more than five years from Jan. 1, 1926, the time of any railroad or terminal corporation to comply with the provision for electrification of roads in New York City.

Supreme Court Upholds Validity of Duluth Case

The Minnesota Supreme Court in a decision on May 14 upheld the state law of 1921 covering the regulation of street railways. The court affirmed the District Court in St. Louis County in the case of the city of Duluth against the Minnesota Railroad and Warehouse Commission. After an order by the commission establishing street car rates in Duluth the Duluth Street Railway made further application for increased rate of fare and asked for determination of the valuation of its properties. The city sought a restraining order in the District Court to prevent the commission from holding more hearings and attacked the validity of the law itself. The railway contended that the 6-cent fare then in effect yielded only 70 per cent of a fair return on the capital investment. District Judges C. R. Magney, H. J. Grannis and E. J. Kenney, sitting together, held the law valid, and the Supreme Court has now affirmed their opinion.

News Notes

Amalgamated Issue Under Advisement.—A motion to dismiss the complaint filed by the Amalgamated Association against the city of Indianapolis, chief of police and others for a restraining order against interference with officers and employees of the association in their efforts to organize a branch in Indianapolis was taken under advisement by Judge Robert C. Baltzell of the United States District Court on May 15. The motion to dismiss was filed by the city and set out fourteen points attacking the jurisdiction of the federal court and denying that rights of the officials of the association were violated by local police as alleged in the complaint. The complaint was filed following the arrest of Robert Armstrong, a vice-president of the association, and other employees.

Railway Transports in Taxis.—Taxicabs were used recently by the Chicago, North Shore & Milwaukee Railroad in Milwaukee, Wis., to maintain service when a fire adjoining the Sixth Street viaduct, over which its cars operate, paralyzed all service between Milwaukee and Chicago. When the fire broke out many persons southbound for Racine, Kenosha, Chicago and intermediate cities were waiting at the main depot. They were loaded into taxicabs and taken over another viaduct to a temporary station established at First and National Avenues, where they boarded an emergency southbound train. On the return trip the same cabs took the waiting northbound passengers to the main station.

Recommends Relief from Paving Costs.—Two committees of the Danville, Va., City Council recently heard arguments from C. G. Holland, president of the Danville Traction & Power Company, in behalf of the modification of the company's franchise and relief from the obligation of paying the costs of street paving between the tracks. The two committees joined in a recommendation to the Council for this relief. As a two-thirds majority concurred in this action, the railway may be said to have won its point.

Wage Contract Renewed.—The Aurora, Elgin & Fox River Electric Company, Aurora, Ill., has renewed its contract with its employees for the ensuing year at the same scale. The employees voted two to one to accept the existing wage. Some changes in working conditions were agreed upon.

Summer Rates in California.—A new schedule has been arranged which provides residents of the territory served by the San Francisco-Sacramento Railroad and the Sacramento Northern Railroad with attractive excursion rates. Under the provisions, tickets good for sixteen days will be sold daily at the rate of one and one-third single fares for the round trip from all points on the two roads and the Sierra Nevada Stage Company and Pierce-Arrow Stage Company to Oakland and San Francisco. The new rates became effective April 30.

Tragic Accident at Atlantic City.—Mrs. Fannie L. Denman, wife of B. J. Denman, vice-president and general manager of the United Light & Power Company, resident at Davenport, Iowa, was killed on May 18 while riding a horse along the beach at Atlantic City. Mrs. Denman was thrown from her horse and suffered a broken neck. She died almost immediately. Mr. and Mrs. Denman were attending the annual convention of the National Electric Light Association.

Another Name Wanted.—An organization newspaper written for and by the employees of the Worcester Consolidated Street Railway, Worcester, Mass., has made its appearance and will be published in the future on the first payroll day of every month. The inter-district news organ is still nameless, being captioned with an interrogation point, but a contest is under way among employees for the selection of a name. The publication contains news of the road, shops and offices, interspersed with bits of humor and anecdotes contributed by employees.

Work Started at St. Petersburg End.—Ground was broken in St. Petersburg on May 8 for the first gas-electric interurban railway, the Florida Interurban Rapid Transit Railroad, that will connect Tampa and St. Petersburg. Actual construction work on the roadbed has already been started. A survey for the route has been completed and 96 per cent of the right-of-way for the route has been acquired. Reference was made to the progress of this project in the ELECTRIC RAILWAY JOURNAL previously.

Railway Plays Its Part.—In honor of "International Boys' Week" the Tacoma Railway & Power Company, Tacoma, Wash., issued special rate tickets on May 8 good all day for grammar and high school students. The company co-operated with Harold R. Pirret, chairman of Boys' Week in Tacoma, in an effort to make the celebration of that week a successful one.

Wage Contract Renewed.—Trainmen of the Wheeling Traction Company, Wheeling, W. Va., have renewed their contract with the company for three years at the old scale. This provides 49 cents an hour for the first three months of service, 52 cents for the next nine months and 57 cents thereafter. Operators of one-man cars receive 5 cents an hour additional.

New Fare Schedule Approved.—The Public Service Commission has approved a new tariff of the Southern New York Railway, Inc., providing for the sale of books containing 30 single tickets, good for transportation of purchaser and member of purchasers' family within 30 days from and including date of sale. The stations included in the tariff are as follows: West Oneonta and Junction, $2; Laurens and Junction, $5.85; Index and Cooperstown, $2.90; Cooperstown and Fly Creek, $5.85; Cooperstown and Toddsville, $3.85. The new fares are effective on June 14, and will continue in effect until June 14, 1927.

"Stop" Signs Ordered.—Several thousand new "stop" signs have been ordered by the Georgia Railway & Power Company, following an order of the Public Service Commission changing approximately 500 car stops on the Atlanta lines. While the commission's order calls for only 500 stops, the company has decided to place new "stop" signs at every stop in the city. The new signs are orange in color, with black lettering, making them more attractive than the old "stop" signs and giving them greater visibility. Within ten days work of rearranging and locating signs will be started.

Baltimore Attends to Complaints.—The United Railways & Electric Company, Baltimore, Md., received a total of 1,953 complaints during 1925, all of which were given the required attention. With a traffic of 330,000,000 revenue passengers this means there was about one complaint from every 163,850 people. The company states that not a single complaint is ignored, every one being subjected to investigation and scrutiny. In its "Service" bulletin the company states that it knows "it has a public that is critical but not sullen, watchful and articulate, but not hopeless of the company's sincerity."

Fares Reduced to Encourage Land Settlers.—To encourage settlement in the attractive new residential districts along Lake Michigan to the north of Chicago, the Chicago, North Shore & Milwaukee Railroad has recently announced a reduction of nearly 53 per cent in the rates for commutation tickets from all suburban communities on the main line and new Skokie Valley division, as far north as the Wisconsin state line. The new schedule, which applies to 10, 25 and 60-ride tickets to Chicago, is effective June 1.

Recent Bus Developments

Michigan Bus Operators Included in Agreement

The dispute between the Michigan Electric Railway, Jackson, Mich., and the Amalgamated Association over the inclusion of bus operators in the Amalgamated agreement with the railway was recently settled by arbitration. An amendment was introduced in the present contract which provides for the inclusion in the existing contract of all motor vehicle employees in the service of the company. This change is intended to bring within the protective terms of the agreement bus operators employed directly by the Michigan Electric in cities and also employed in bus operation between the cities of Lansing and St. Johns, but it especially excludes all others employed in interurban service. The amendment will not cover interurban bus drivers who are in the service of the Southern Michigan Transportation Company, a subsidiary of the Michigan Electric Railway operating between Jefferson, Battle Creek and Kalamazoo, known as the Southern Division, and between Jefferson and Lansing, known as the Northern Division. The agreement was signed by George A. Kelly and Norman E. Leslie. Richard Price, the third arbitrator, plans to submit a minority finding.

Buses Operated at Loss in Tampa

Operation of buses in connection with the railway lines in Tampa, Fla., by the Tampa Electric Company is being carried on at a loss, according to a reported statement of Peter O. Knight, president of the company. Although the bus fare is 10 cents—twice as much as the railway fare—the company has been unable to make any net returns from the operation of buses, which was started in September, 1925. The company now has 23 buses in operation, and the results to date show total gross receipts insufficient to pay operating expenses. In order to keep up with increased population, the railway has ordered fifteen more cars for operation and eight more buses.

Bus Rights Granted in Westfield

The effort of the Springfield Street Railway to obtain additional licenses to operate other bus lines in Westfield, Mass., was successful on May 6 when the City Council of Westfield agreed to grant the necessary authority to operate. With the placing of these additional bus lines in service will come the abandoning of practically all the trolley lines in Westfield. Only one cross line trolley route will be operated in addition to the suburban line to Springfield.

The railway was granted licenses to operate two bus lines last fall, and at that time it discontinued railway service on Mill and Union Streets. Permission to add new bus routes will eliminate trolleys on Broad, West Silver, East Silver and Franklin Streets and on the Huntington line.

The only remaining intercity railway line will be operated from the Highlands to North Elm Street, at Clay Hill. The Westfield-Holyoke line will be abandoned. The company has agreed to operate buses to St. Mary's Cemetery, which heretofore was served by the Holyoke trolley.

Westfield has been decidedly against the abandoning of any of the trolley lines. The question has come up many times over a period of a year until it was finally stated that the railway would not continue to operate any of the railway lines at a loss. Thus the City Council was confronted with giving the required bus licenses or running the chance of seeing the railway withdraw service. The railway has promised an efficient service with buses.

Buses Meet Emergency in Akron

Vehicles Turned to Advantage to Meet Strike Conditions—Full Story of What Was Done to Transport People in City and Interurban Service

THIS is a bus story—the story of how buses met an emergency in Akron city service and in interurban service from Canton to Cleveland when 750 platform men employed by the Northern Ohio Power & Light Company struck on May 1.

It was not until 9 o'clock Saturday night, May 1, that the company learned trainmen would not take the cars out Sunday morning. That meant Sunday churchgoers would have no service except that supplied by buses and the few cars manned by employees who remained loyal. Twenty-eight street cars left the Kenmore carhouse Sunday morning on the main Akron city lines. Buses supplied the rest of the service.

On the Canton-Akron-Cleveland line not a car left the carhouse. It was up to the buses to stand alone. At 4 o'clock Sunday morning, seven hours after the Amalgamated Association had issued the order to strike, the first bus left the Terminal Building in Akron for Cleveland.

Right there this story starts. Commencing at this early hour—4 o'clock—on May 2, a bus entered or left the Terminal Building with a load of passengers every nine minutes until midnight—twenty hours later. And all of these trips were operated between Cleveland, Akron and Canton. A total of 140 trips was operated between Cleveland and Akron and 40 between Akron and Canton, a grand total of 180. Assuming that an average of 25 passengers was handled each trip, the buses moved 4,500 persons.

All of this operation was accomplished with a fleet of 25 buses—an average haul of 180 persons per bus. If all of the bus trips made during the day—180—were combined in one line, they would have made a bus caravan a mile long, with 120 ft. to spare for good measure.

What the bus company did on this day it has been repeating virtually every day since. Morning, noon and night the buses, like Tennyson's famous brook, go on and on, that transportation needs of the public may be efficiently satisfied.

To perform this tremendous service the bus company, on these 180 daily trips, operates approximately 6,500 miles, as compared with 3,000 miles before the strike. The 180 trips represent an increase of 96; the daily average previous to the strike was 84.

True, 22 buses were added to the total fleet and every bus owned by the company was pushed into service during the first week. Buses that were in the shops for repairs were rushed through and in service in two days. Ten new buses came from Cincinnati and twelve from various other sources. The close of the third week will find twenty more in service over the system.

When the strike came, the company was operating 114 buses in Akron city. Two days later the company had 130 in operation and two days more 140 were in use, with 58 interurban buses running. Most of these buses were drawn from the reserve supply.

Did they furnish the city service? The people say they did. Of course, there was much crowding. The buses were loaded, but the equipment stood up well. Of course the condition that existed could not be continued indefinitely, but the buses served satisfactorily until normal railway service was restored in Akron and suburban districts.

It is true that the public welcomed the car service back. This only goes to furnish additional evidence that coordinated bus and rail transportation is what they want.

The interurban situation was different. Patrons paid approximately 40 per cent higher fares on the interurban buses than they formerly did on the cars. They did this willingly and there have been few complaints. The interurban buses have been crowded, and it was necessary at times to switch city buses into interurban and suburban service. The complaints that came in were from the Akron-Canton division, where the service was not so good as between Akron and Cleveland. Between Canton and Massillon, where four big buses furnished a fifteen-minute service, there was not a single complaint. Fares by bus and by rail in the city of Akron were the same.

Although service was more than doubled, the efforts made merely represented what a loyal organization can do in an emergency. In brief, it is the "acid test" of bus service in northeastern Ohio. Every man in the company's bus system just put his shoulder to the wheel and worked faithfully. As one

of the interurban bus drivers expressed it, by quoting Elbert Hubbard: "If you work for a man, in Heaven's name work for him. If he pays you wages that supply your bread and butter, work for him, speak well of him, stand by him and stand by the institution he represents. If put to a pinch, an ounce of loyalty is worth a pound of cleverness." That's the secret of the operation.

Credit for this successful bus operation is shared by all departments of the company. The garage force, like the bus drivers, has battled 100 per cent. The men that compose it have kept the equipment serviced, day and night. In fact, the records show that the fleet of buses has operated 97.5 per cent perfect. And when that per cent in operation is reached, it is a job pretty well done.

When it is taken into account that the majority of the buses are on the road twenty hours a day, an adequate idea is conveyed of the maintenance problem. It's a four-hour job; that is, the mechanics have four hours in which to work to keep the buses running twenty. Then, too, it must be remembered that five different kinds of equipment are used—Yellow Coaches, Whites, Pierce-Arrows, Studebakers and Fageols. This means that both the operating force and the mechanical force must be more or less versatile. Necessity often requires that a driver or a mechanic be shifted from one make of bus to another, so that service may not be interrupted. But it was done, and buses have demonstrated what they could do in an emergency when operated by a company that knows the transportation business. At no time was there the slightest confusion. Schedules were kept almost to the minute.

The buses performed a real service—a service that pleased the public, kept transportation going and proved a blow to the Amalgamated Association.

Partial Bus Substitution Proposed in Westchester County

The Westchester Electric Railroad has petitioned the Public Service Commission for permission to abandon a portion of its route in the town of Eastchester and the village of Tuckahoe, Westchester County, N. Y., and substitute bus service to be supplied by the Eastchester Transportation Corporation. It is claimed that this part of the route does not pay the operating expenses. Main Street, Tuckahoe, is to be paved, the petition says, and the village desires to have the tracks removed when the new pavement is laid.

Consents to bus operation have been given by the village and town authorities. It is proposed to operate buses between 6 a.m. and 1 a.m. on not more than a fifteen-minute headway. A 10-cent fare is proposed, with free transfer from the buses to the intersecting electric railway lines. Transfers will be given from the electric railway lines to buses for an additional fare of 5 cents. For pasengers traveling only between the Tuckahoe Railroad station and Waverly Square or between the Tuckahoe station and Bronx River it is proposed to charge a 5-cent fare. Where the 5-cent fare is effective no transfers will be given according to the petition.

Bus Routes in Northern Illinois Proposed

The Western Motor Coach Company, headed by Britton I. Budd, associate of Samuel Insull and president of the Chicago, Aurora & Elgin third rail line, has applied to the Illinois Commerce Commission for authority to operate a network of bus lines through northern Illinois, which would serve that section, the southern Wisconsin territory and connect with other lines reaching through Iowa, central and southern Illinois and Indiana. Elgin will be the hub of the proposed system. The four principal routes are between Wheaton and Westmore, Elgin and Bellwood, Oak Park and St. Charles and LaGrange and Aurora.

Buses Leased for Use in Toledo

Seven buses have been leased by the Community Traction Company, Toledo, Ohio, for use on Front Street while tracks are being taken up from that street and repaving is in progress. The City Council last year voted to tear up the tracks on that street.

Plans for a permanent bus service are not complete, but in the Riggs survey it was recommended that bus lines supplant car lines on all except the downtown loop, which could be cared for by several other east side lines through transfer.

The buses are owned by the Union Motor Truck Company, Bay City, and have been in use before in Detroit.

The new equipment is operated by employees of the Community Traction Company. The new plan of leasing equipment and operation by company employees has been found much more satisfactory than the "farming out" plan tried in Toledo for more than a year on some feeder lines.

Seven Cents on Buses.—Permission to increase bus fares immediately from 5 to 7 cents on all lines in the city of Evanston, Ill., was recently granted to the Evanston Bus Company, a subsidiary of the Evanston Railway, by the Illinois Commerce Commission. A rate of $2.25 for a 50-ride ticket, however, will be maintained for the benefit of students of a new high school at the western limits of the city.

Bus to Be Given a Trial.—The Menominee & Marinette Light & Traction Company is considering the purchase of a 21-passenger bus with a view to experimenting with bus service in outlying territory to determine whether patrons, city officials and the company would prefer bus to railway operation on outlying lines. The company hopes to give the plan a trial in Marinette, Wis., and Menominee, Mich., during the summer months.

New Route Authorized.—The Public Service Commission on May 17 granted a certificate to the Rochester Railways Co-ordinated Bus Lines, Inc., for the operation of a bus line in the city of Rochester, N. Y., and town of Irondequoit. The route will connect with the Rochester Street car lines at St. Paul Street and Ridge Road and will make a belt through the town of Irondequoit, connecting again with the street car lines at Clifford Avenue and Culver Road. The route is divided into three zones with a 10-cent fare in each zone. There was no opposition at the hearing to the granting of the petition.

Bus Company in Nashua.—Buses operated in the interest of the Nashua Street Railway, Nashua, N. H., will be run by the recently organized Nashua Transportation Company, incorporated under the state laws with the following officers: President, Josiah E. Fernald; secretary, Chester W. Clark, both of whom are directors with Englehardt W. Holst, manager of the railway.

Problems of Miami Beach to Be Discussed.—Citizens of Miami Beach, Fla., and officials of the Miami Beach Electric Company will consider, it is reported, the advisability of a double-deck bus system to replace the present railway system in Miami Beach. The decision came about as a result of a written communication from the Miami Beach Realty Board to members of the City Council. City Manager Renshaw will make a report after consultation with citizens and railway officials.

Permit Authorized Between East Chicago and Hammond. — The Gary Railways has received a permit from the Public Service Commission to run a bus line from Cline and Block Avenues, in East Chicago, to Sheffield and Gostlin Avenues, Hammond, Ind. The commission denied a petition of the Midwest Motor Coach Company to operate a bus line between Gary and Hammond and refused to grant the right to the Gary Railways to operate a new line between Gary and Hammond. In the two denials the commission ruled that public convenience and necessity did not require the proposed bus service.

Would Extend Bus Services.—The Pacific Electric Railway has applied to the California Railway Commission for authority to operate motor coach service in the city of Pasadena, covering lines now operated under the name of the Pacific Electric Land Company.

Buses Authorized to Replace Cars.—The City Council of Salem, Ore., on May 3 granted permission to the Salem Street Railway to discontinue railway service on its South Commercial Street Fair Grounds line and to substitute buses. The Council also reduced from $50 to $25 a year the license fee which the railway paid on buses. This leaves only two lines in Salem now served by the railway.

Authorization for Service Between Boston and Worcester.—The Boston & Worcester Street Railway has been granted a certificate of public convenience and necessity to operate motor coaches between Boston and Worcester, Mass.

Bus Reorganization Under Consideration.—The Jamestown Street Railway, Jamestown, N. Y., is planning a reorganization and rerouting of its buses. If the plan does not produce revenue sufficient to warrant the needed replacement of buses now in operation, service will be abandoned. Some time ago the Jamestown Motor Bus Transportation Company, a subsidiary of the Jamestown Street Railway, notified the City Council that it contemplated the abandonment of its bus lines in the city, but no date was set for the discontinuance of service.

Financial and Corporate

Court Upholds $7,000,000 Easement Allowance at Baltimore

An opinion handed down by Judge Eli Frank in the Circuit Court of Baltimore upholds the Maryland Public Service Commission in placing a valuation of $7,000,000 on the easements of the United Railways & Electric Company, Baltimore, and also upholds the commission in allowing $8,560,210 as "going value" of the railway property. Both these items were included in a recent valuation of the United property fixed by the commission. The total value was $77,000,000.

Clarence W. Miles, formerly people's counsel, took the case into court following the commission's action. The opposition to the "going value" was from William S. Norris, president of the People's Corporation. Judge Frank said:

> The easements of the railway are property in the sense that they cannot be taken even for public use without full compensation being paid for them. I have been referred to, and have found no case in which the allowance of a value to easements by the state authorities has been declared improper by the federal courts. It is only where such allowance has been refused and such refusal has been claimed to be confiscatory that its property has been passed upon.

After citing numerous authorities on the various points involved, Judge Frank said that an analogous argument might be made in the case of the United.

"It was the result in 1899 of the consolidation of several corporations, under the provisions of the general corporation law of this state," he said. "The easements of its constituent companies became vested in it. It issued many million dollars of securities, bonds and stocks, upon the faith of its ownership of its tangible property, franchises and easements. These securities have been largely dealt in for more than 26 years on the basis of such ownership."

The court then said:

> I cannot reach the conclusion that easements which are real property subject to taxation, of which the owner cannot be deprived without just compensation, which became subject to the liens of its mortgages prior to the enactment of the public service law, upon the ownership of which it has obtained credit and upon the faith of which it sold its securities to the public, is not to be regarded as property upon which it is entitled to earn a fair return. As the valuation made by the commission is *prima facie* evidence of the value of said property in all proceedings before the commission, the importance of the valuation herein involved is apparent.
>
> The valuation of $7,000,000 made by the commission which is now the subject of attack was reached without reference to the earning capacity of the easements so valued. The objection to valuing an easement in a rate base in terms of earnings is self-evident. The greater the earnings, the larger the value of the easement. The greater the value of the easement, the larger the fair return that must be allowed upon such value. While certain authorities regard this situation as conclusive against the inclusion of easements for rate valuation purposes, that result should be reached only where the value of the easement can be determined solely from the earnings of its owner. . . . The special recognition of the easement as taxable property in Maryland, coupled with its assessability without reference to earning capacity, seems to me to justify its treatment by the commission as property for rate-making purposes. I, therefore, approve the order of the commission on this point.

In discussing the petition opposing the $8,560,210 "going value" item, the court says:

> It claims as matter of law that no award for going value can be made, that this element of value is already taken care of in the valuation of the tangible property of the company. On the other hand, the railway insists that the allowance made is, as a matter of fact, inadequate. Both of these contentions involve matters of fact. If in fact allowance for going value has been included in the valuation of tangible property, then obviously to value it separately would be a mere duplication which is not permissible. I do not find such to be the fact.
>
> That going value is allowable as a part of the rate basis is determined by ample authority.
>
> Constitutional protection against confiscation does not depend on the source of the money used to purchase the property. That it has been paid for out of past earnings is no ground for refusing a fair return on it.
>
> The fact, therefore, that going value was built up by the expenditure of past earnings furnishes no reason for denying it its reasonable value. In this regard, also, I approve the unanimous conclusion of the commission.

Announcement has been made that the case will be taken to the Court of Appeals of Maryland.

$1,000,000 Price for Alton Properties

An "upset" price of $1,000,000 has been set by United States District Judge Lindley for the sale next month of the physical properties of the Alton Gas & Electric Company and the Alton, Granite & St. Louis Traction Company, referred to in the ELECTRIC RAILWAY JOURNAL, issue of May 15, page 867. The sale was authorized by Judge Lindley to satisfy a mortgage covering the property of the two companies. The total indebtedness of the concerns amounts to about $4,000,000. The price set by Judge Lindley is the lowest bidders will be allowed to offer at the sale to be held in Edwardsville. It is likely that the property will be sold in groups rather than in its entirety.

The lowest prices Judge Lindley authorized on the groups were: $180,000 for interurban electric lines, $270,000 for the Alton city lines, $150,000 for the gas property and $400,000 for the electric property. Thomas Gregory, vice-president of the East St. Louis & Suburban Company, is receiver for both companies.

More Moves in Cincinnati Changes

Frederick W. Hertenstein, president of the Western Bank & Trust Company, and William F. Wiley, general manager of the Cincinnati *Enquirer*, have resigned as directors of the Ohio Traction Company, Cincinnati, Ohio, which formerly operated the electric railway system of Cincinnati under a lease from the Cincinnati Street Railway. The system reverted to the original owners under an agreement reached last November. Messers Hertenstein and Wiley have been succeeded on the board by Theodore H. Schoepf, brother of W. Kesley Schoepf, president of the Ohio Traction Company, and Gustav Weil, a member of the brokerage firm of Weil, Roth & Irving. Committees representing the preferred and common stock holders will meet shortly to decide on a plan of distribution of the assets of the Ohio Traction Company, which ceases to exist as an operating company in view of the recent changes of the traction situation in Cincinnati.

Committee Formed to Protect Auburn-Syracuse Holders

Affairs of the Auburn & Syracuse Electric Railroad, Syracuse, N. Y., are reviewed in a statement made by a committee representing the holders of the bonds of the company. The railway was unable to provide funds for the payment of the interest due on April 1, 1926, on its bonds. The committee says that constant effort has been made to offset decreases in earnings through the introduction of economies of every nature in the operation of the road, but that net earnings have gradually been reduced to a point where they are insufficient to pay the annual interest requirements of the bonds. The committee says:

> The problems which have been encountered are fundamental. The rapid construction of hard surface roads and the increasing favor with which the bus and the privately owned automobile are regarded as a mode of transportation have combined to make for a falling off of about 15 per cent of the number of passengers carried in the five years ended Dec. 31, 1925. The rates of fare have been increased to 7 cents in Auburn and to 3 cents a mile on the interurban line. Further increases in rates are deemed inadvisable by the management in that they would, in their opinion, work to produce a decrease in traffic which would offset the increased income. Notwithstanding the increase in rates, the establishment of a bus system and the efforts of the management to bring operating expenses to an irreducible minimum, there are constant decreases in passenger traffic and earnings. This is due to the competition from motor vehicles. Furthermore, the constant increase in the mileage of hard surface roads and in the number of automobiles in use in the company's territory would seem to indicate that the present unsatisfactory situation will become more acute in the future.

The gross earnings, net earnings (after operating expenses, maintenances and taxes, but before provision for depreciation), and revenue passengers carried for each of the calendar years 1921 to 1925 follow:

	Gross Earnings	Net Earnings	Revenue Passengers
1921	$636,472	$118,925	3,904,572
1922	583,701	121,139	3,884,721
1923	625,862	116,524	4,137,734
1924	555,440	99,229	3,665,318
1925	509,837	59,575	3,343,573

The annual interest requirement on the bonds, of which there are $1,752,000 outstanding, is $87,600.

The company renders electric railway service in Auburn, N. Y., and between that city and Syracuse, N. Y. The property includes 56.45 miles of track (single-track equivalent) and 44 passenger cars. In addition the company owns an amusement park at Owasca Lake, south of Auburn. Franchises where necessary are satisfactory from a business standpoint. The line between Auburn and Syracuse, a distance of 27 miles, is located for the most part on private right-of-way.

Deficit in Toledo in April

Operations of the Community Traction Company, Toledo, Ohio, during April resulted in a net deficit of $7,230, it was reported by Commissioner E. L. Graumlich to the street railway board of control at its monthly meeting on May 15. Total revenue was about the same as a year ago, but expenses of additional service, more power and refunds for overcharges to interurbans renting tracks produced an unfavorable result. Passenger revenue showed a gain of $5,449 over April 1925 and totaled $299,575. Revenue passengers totalled 4,275,732 in April, which showed a gain of 1,040 a day over March this year. This is the first time in several years that April has shown better results than March.

The commissioner's report also indicated that the Oak Street bus feeder line, the pioneer in its field, for the first time had shown a surplus over operating expense. The company took over the operation of the line last month with leased equipment and its own operators. Maintenance costs were practically nothing due to the new equipment. Other bus operations showed a loss. A total of 58,101 passengers on feeder buses was carried in April.

$1,301 Balance for Cincinnati Street Railway in April

Operations of buses by the Cincinnati Street Railway, Cincinnati, Ohio, reduced the company's revenue, in so far as the electric railway system was concerned, in April, according to a report filed with Edgar Dow Gilman, Director of Street Railroads and Motor Buses, by Walter A. Draper, president of the railway. The report covers operations for April and shows a decrease over the previous two months. Mr. Draper explained that the loss was not a loss in a direct sense to the company in that the bus operations likely would show sufficient revenue to offset the loss in electric transportation.

The railway has been endeavoring to link up its electric transportation system with its bus lines, and in this rearrangement naturally has incurred expenditures which undoubtedly will be eliminated when the readjustment is completely worked out. The revenue and expenses during April follow:

Operating revenue	$645,464
Operating expenses	465,615
Net operating revenue	$179,848
Taxes	58,221
Operating income	$121,627
Non-operating income	$4,857
Gross income	$126,484
Rental, interest, sinking fund and return on captial	125,182
Balance	$1,301
Revenue passengers	7,559,593
Transfer passengers	2,500,032
Free passengers	117,168
Total passengers carried	10,176,793

Will Operate Line in Ocean City

Upon application of the city of Ocean City, N. J., Chancellor Walker has appointed Robert E. Chew of that place as trustee to operate the Ocean City Electric Railroad, which previous to 1919 operated as a traction corporation at the shore resort. The company, as in the past few years, indicated to the authorities that it would not run its cars, which would mean that the city would be without trolley service. Mr. Chew will be paid $1,500 for his services as trustee in the operation of the line until Dec. 1 next. Twenty-five per cent of the gross receipts may be expended toward the purchase of new equipment. When the trustee concludes the operation of the line he will be required to pay to the company $3,750 for the use of the property. The proceedings were started under the act of 1919, which authorizes fourth class communities to take over the property of traction corporations which have abandoned their railway lines.

Earnings Reported in Grand Rapids

Results for 1925 Considerably Below Allowable Return, but Outlook Very Promising—Interesting Review of the Progress of the Company

BASED on the rates of fare which prevailed throughout the year 1925, viz., 10 cents cash or six tickets for 50 cents, the Grand Rapids Railway, Grand Rapids, Mich., was entitled under its service-at-cost franchse to earn a return of 7⅜ per cent on the value of its property, after deduction of operating expenses and taxes and making provision for property retirement. Due largely to the need for operating leased equipment and to delay on the part of the city in carrying out certain work the company's earnings were $172,203 less than the allowable return.

COMPARATIVE STATEMENT OF INCOME AND EXPENSES OF GRAND RAPIDS RAILWAY

Gross Earnings:	1925	1924
Passenger revenue	$1,697,310	$1,719,562
Revenue from special cars, etc.	4,273	2,132
Rent of equipment, tracks, etc.	23,994	38,794
Non-operating revenue	13,200	10,843
Total	$1,738,779	$1,771,332
Operating Expenses and Taxes:		
Operating expenses	1,172,157	1,099,175
Taxes	144,122	137,542
Total	$1,316,279	$1,236,717
Gross income available for fixed charges, retirements and dividends	422,499	534,615
Interest on funded debt	268,248	261,959
Other fixed charges, including amortization of debt discount	55,828	82,768
Provision for retirements	165,963	144,459
Total interest, other fixed Charges and retirements	$490,041	$489,187
Net income	67,541*	45,427
Ratio of operating expenses to gross earnings, per cent	67.93	62.43
Ratio of operating expenses and taxes to gross earnings, per cent	75.70	69.82

* Deficit.

L. J. DeLamarter, vice-president and general manager of the company, explains that the high cost of operating rented cars and their general unfavorable appearance and riding qualities quite naturally affected both passenger riding and operating expenses during the year. Another factor which affected earnings in 1925 was the inability of the city authorities to adopt a definite plan for the widening of Division Avenue, over which several of the main lines of the system operate. This caused delay in laying new rail on this street. In consequence the company was burdened with track maintenance which required an unusual amount of labor and material to keep in operating condition. It is expected that this matter will be settled in the near future, thereby enabling the company to carry out its track renewal plans and so relieve it of the extra maintenance expense caused by present conditions.

In trying to keep pace with the city's growth, meet present day needs by improvements to its property that were imperative and make additions to conform to the public demands the company expended $321,036 during the year. These capital outlays have not only improved the physical condition of the property but, as part of a broad general program, they will enable the company to give a quality of service which will attract added patronage. Mr. DeLamarter says that the cumulative benefit of the expenditures which have been made since Jan. 1, 1922, and which total $1,099,608 over the period 1922-1925 inclusive, is evidenced by the improved condition of the property and in the fact that there is a public appreciation of the company's activities in this respect.

As referred to in the report for the year 1924, the company suffered a heavy loss of equipment in the Hall Street carhouse fire, all of which was covered by insurance. Recognizing the existence of changed conditions in the transportation field, the management decided that rather than proceed immediately with the replacing of its lost cars by others of similar character, the time had come to experiment with an entirely new street care designed better to serve and satisfy the riding public and to encourage increased car riding. As a result, the company carried on during the past year practical tests of three new types of electric rail coaches, embodying advanced ideas. Based on the results of these tests, the company has ordered for delivery in the spring of 1926 27 additional cars, which incorporate the best features of the three test cars. Mr. DeLamarter says:

> Coincident with these tests, a number of improvements were effected in present equipment. Recognizing the general attractiveness of bright color schemes, the company started an extensive car painting and renovating program and has received a great deal of commendation not only locally but nationally because of this work. Interest was further stimulated by naming each car after some local pioneer or person prominent in the development of the city of Grand Rapids. Another development has been the rebuilding of a "Birney" safety car with spring-filled leather upholstered seats and cushions and a smoking compartment. This experiment, if it proves out, will be followed by the rebuilding of additional "Birney" cars.

As a result of a plan of co-operating with the drivers of commercial vehicles, which has cost the company a negligible amount, there is being developed a spirit of helpfulness which is reducing delays due to blocking of tracks and lessening vehicle collisions. A reduction of approximately 23 per cent has been made in the number of col-

lisions between commercial vehicles and street cars. Accident expense has reduced to less than 2 per cent of the transportation revenue. The company operated 3,674,633 car-miles in 1925 without a fatal accident to passengers or employees.

Despite the fact that the new electric rail coaches are not yet in service and that because of the fire, the company was forced to resort to the use of a number of rented cars, the program as worked out thus far gives promise that the results anticipated will be realized. In this connection it is pointed out that revenue passengers carried during the last quarter of 1925 show an increase over those carried during the corresponding period of the previous year.

A personal solicitation campaign of self-interest among store proprietors along street car routes has been started, and the relation of street car patronage to merchandise sales and the "cash register value" of supporting and talking in favor of the electric railway is being presented. This creates a realization that the use of the merchant's corner by riders waiting for cars brings more business than automobiles passing by or parking blocks away. Time-tables showing the passing time of street cars at particular points are placed on show cases in corner drug stores or other places of business near busy street intersections.

The motor bus service established by the company was improved during the past year. As needs justify, plans will be developed for further adequate bus service. In this connection the buses are operated on a straight 10-cent fare with transfers.

No public financing was done by the company during the year. Of the $368,112.27 insurance money received plus interest on the unexpended balance, there remained on deposit with the trustee as of Dec. 31, 1925, a total of $168,050, the difference having been expended for additions and improvements, including new buildings and car storage facilities on the old Hall Street carhouse site and the purchase of the three experimental electric coaches described in a former paragraph. The purchase of the 27 new coaches was arranged on a satisfactory payment basis.

New High Record for Passengers Carried in Chicago

Traffic on the Chicago Surface Lines is steadily gaining in volume. During April a new high record for the number of passengers carried was established, when the daily average number of rides equaled 4,381,763. The nearest previous approach to this number was reported for February, this year, when 4,331,531 rode daily. The total number of rides during April was 131,542,899, an increase of 5,400,422 over April, 1925.

In connection with the monthly report it is pointed out that during the first four months of this year, there have been 16,621,334 more rides on the surface lines than during the corresponding four months of 1925.

Gross earnings for April were $5,059,784, compared with $5,127,372 in the previous month and $4,838,293 in April of last year. Expenses were substantially reduced in comparison with those for March, but represented increases over the amounts spent in April of last year. Divisible receipts of $308,417 gave the city $169,629 for its 55 per cent interest in earnings and permitted a balance of $138,788 to the companies.

A comparison of the April statement with that for the similar month last year follows:

	1926	1925
Passenger cars, including motor cars	$5,059,784	$4,838,293
Other income	55,799	54,276
Gross earnings	$5,115,583	$4,892,569
Expenses:		
Way and structures and equipment	676,731	591,633
Renewals	409,247	391,405
Power	339,033	315,285
Conducting transportation	2,041,655	1,983,929
Damages	373,843	357,013
Taxes	275,000	255,000
Total operating expenses	$4,115,509	$3,894,266
Residue receipts	$1,000,073	$998,303
Less joint account expenses	20,000	10,000
5 per cent on purchase price	671,656	670,032
Divisible receipts	308,417	318,271
City's 55 per cent	169,629	175,049
Company's 45 per cent	138,788	143,222

Net Income Higher.—For the ten months period ended April 30, 1926, the total operating revenues of the Brooklyn-Manhattan Transit Corporation, Brooklyn, N. Y., was $37,084,474, against $35,775,680 for the ten months period ended April 30, 1925. Operating expenses increased from $23,494,442 to $24,158,645. The net income for the ten months of the 1926 period was $4,631,470, against $4,119,290 for the ten months peroid ended April 30, 1925.

Improvements to Be Capitalized.—The Chicago, North Shore & Milwaukee Railroad, Highwood, Ill., has applied to the Illinois Commerce Commission for authority to issue $1,000,000 of prior lien preferred stock and $1,250,000 of first and refunding bonds. The proceeds will be largely used to reimburse the treasury for expenditures on the new Skokie Valley line, costing about $8,750,000. The extension is about ready to be placed in operation.

Gross Earnings Increase.—For the three months period ended March 31, 1926, the gross earnings of the Indianapolis Street Railway, Indianapolis, Ind., were $1,469,877, compared with $1,431,535 for a similar period ended March 31, 1925. For the month of March, 1926, the gross earnings of $510,006 were approximately $22,000 in excess of the gross for March, 1925. The net earnings showed a decrease of $5,625.

Seeks to Abandon Line.—The Sacramento Northern Railway has applied to the California Railroad Commission for authority to abandon its line of track extending from Park Avenue and Sixteenth Street, in the City of Chico, thence extending into Fifteenth Street, Mulberry Street and to the end of the line. It is stated that the patronage of the line does not warrant the expense of maintaining and operating it. An average of 125 passengers per day only is carried on the line.

Net Income Increases.—The Middlesex & Boston Street Railway, Newtonville, Mass., reports for the quarter ended March 31, 1926, a net of $19,318, after interest and taxes, compared with $17,819 in the corresponding quarter of 1925. Passenger revenues increased from $289,460 to $299,831 and operating expenses from $232,836 to $243,397.

$26,110 for Surplus.—The Stockton Electric Railroad, Stockton, reports to the California Railroad Commission its 1925 operating revenue at $311,761 compared with $311,930 for 1924. The operating expenses, excluding taxes, for 1925 are reported at $267,318 and at $262,282 for 1924, leaving net operating revenue of $44,443 for 1925 and $49,648 for 1924. During 1925 taxes charged to operation amounted to $21,336 and for 1924 to $23,278. Deducting the taxes leaves operating income of $23,107 for 1925 and $26,369 for 1924. Adding to the operating income the non-operating income of the company results in a gross corporate income, which represents the amount available for interest, amortization of debt discount, other fixed charges, non-operating expenses, dividends and surplus, of $26,110 for 1925 and $30,744 for 1924.

Total Earnings in Madison Improve.—Earnings of the railway department of the Madison Railways, Madison, Wis., for the months of March and April were below the average of the corresponding months for the last four years, but the total earnings continue to improve since the institution of city bus service. During March 626,074 railway and bus passengers were carried, against 575,121 in 1925; for the last four-year period the average was 680.487. Gross car and bus revenues in March was $41,808, against $37,548 in 1925; average for the four-year period was $39,744. During April 551,417 bus and railway passengers were carried, compared with 490,017 in April; average for four-year period, 609,802; total earnings during this month were $37,109, against $31,914 last year; average for the four-year period, $35,628.

$1,654,767 Available for Surplus.—The Los Angeles Railway Corporation, operating in Los Angeles, Cal., reported to the Railroad Commission its 1925 operating revenue at $12,852,118, compared with $13,097,425 for 1924. The operating expenses, excluding taxes for 1925 are reported at $10,507,389, and at $9,854,447 for 1924, leaving net operating revenue of $2,344.729 for 1925 and $3,242,978 for 1924. During 1925 taxes charged to operation amounted to $820,315, and for 1924 to $868,054. Deducting the taxes leaves operating income of $1,524,414 for 1925 and $2,374,924 for 1924. Adding to the operating income the non-operating income of the company resulted in a gross corporate income, which represents the amount available for interest, amortization of debt discount, other fixed charges, non-operating expenses, dividends and surplus, of $1.654,767 for 1925 and $2,501,969 for 1924.

Court Sanctions Expenditures.—Judge E. D. Shurtleff in the Winnebago County Circuit Court, Rockford, Ill., has signed an order authorizing Adam Gschwindt, receiver for the Rockford City Traction Company, to sign contracts for material and labor to the extent of $75,000 to complete the work of double-tracking the Seventh Street line. It is considered that the court's action may be the forerunner of authorization to sell real estate to provide the necessary funds.

Personal Items

E. M. Lunda Is Doing Big Job in Grand Rapids

Introducing a comprehensive system for recording defects in rolling stock and determining individual maintenance costs for each class of equipment are some of the principal tasks before E. M. Lunda, superintendent of shops and equipment of the Grand Rapids Railway, Grand Rapids, Mich. Mr. Lunda, whose appointment to this post was referred to in the ELECTRIC RAILWAY JOURNAL late last year, believes that a comprehensive recording system will assist materially in preventing defects in equipment and in promptly correcting them when they do occur. It is Mr. Lunda's policy to make the Grand Rapids system one of the most modern in the country. In this all-important work he succeeded William Goldner, who was in the employ of the company for approximately 37 years.

Mr. Lunda entered railway work in 1922 in the employ of the Wisconsin Public Service Corporation as engineer of equipment, at which time the interurban lines were changed over to one-man operation. A year later he was appointed master mechanic of the Green Bay Division in charge of equipment and substations. Having proved his worth in this capacity he was appointed general master mechanic of the Wisconsin Public Service Corporation's railway properties in 1924. He resigned on Sept 1, 1925, to accept the position of engineer of equipment with the Grand Rapids Railway.

Mr. Lunda was born in New Glarus, Wis., in 1898. He was graduated from the Janesville High School, and then did three years of general college work at Milton College. Later he entered the University of Wisconsin Engineering College and was graduated in electrical engineering in 1922, specializing in electric railways and central stations.

Change in Personnel in Grand Junction

The new officers of the Grand River Valley Railway, operating between Grand Junction and Fruita, Col., are Clare N. Stannard, president; Guy W. Faller, vice-president; Charles Rump, manager; John E. Loiseau, secretary, and Harry Hughes, treasurer. The company was recently sold by the Penrose-Carlton interests to Henry L. Doherty.

Carl H. Allen, formerly superintendent of the Illinois Traction, Inc., at Ottawa, Ill., was named temporary general manager of the company with headquarters at Joliet. He succeeds F. E. Fisher, who will take several months leave of absence.

A. B. Coryell, general superintendent and purchasing agent of the Windsor, Essex & Lake Shore Rapid Railway, Kingsville, Ont., has also taken over the duties performed heretofore by the superintendent of way and structures. That office has been abolished.

New General Superintendent of Chicago "L"

Harry G. Hardin has been appointed general superintendent of transportation of the Chicago Rapid Transit Lines, succeeding the late John H. Mallon. Mr. Hardin's promotion to this post comes after 25 years of service with the "L" lines, during the last two of which he has been acting general superintendent.

He joined the "L" organization in 1901 as an extra trainman on the Metropolitan West Side Elevated Railway and worked his way up through various stages of promotion until, at the time of consolidation of the Elevated lines in 1911, he was serving as despatcher at Laramie Avenue on the Garfield Park branch of the Metropolitan.



H. G. Hardin

The same year he was appointed superintendent of transportation of the Chicago & Oak Park Elevated Railroad. He retained this position until 1920, when he was made assistant to the general superintendent of transportation. During 1921 Mr. Hardin served as general superintnedent of the Chicago & Interurban Traction Company, retaining his connections with the Elevated lines.

In 1922 he was made superintendent of transportation of the Chicago Northwestern Elevated Railroad, and the following year assumed similar duties with the South Side Elevated Railroad, holding the two positions simultaneously. He was appointed acting general superintendent of the Chicago Rapid Transit lines in November, 1924.

Mr. Hardin was born in Little Rock, Ill., in 1883. He came to Chicago with his parents in 1887. Previously to joining the "L" organization, Mr. Hardin was connected with the Kellogg Switchboard & Supply Company in Chicago.

Safety Director in New Post

John J. Connors, Who Made Remarkable Record at Nashville, Appointed to Atlanta Post

John J. Connors, safety director of Nashville Railway & Light Company, Nashville, Tenn., since 1923, has been appointed to a similar position with the Georgia Railway & Power Company, Atlanta, Ga. Mr. Connors has been speaking daily for several months before employees of industrial plants in Nashville in the interest of safety and last fall started the Safety Drivers' school at the Chamber of Commerce. He is chairman of the membership committee, electric railway section of the National Safety Council.

Mr. Connors is widely known among electric railway men, but few, perhaps, realize the extent of the experience which he has behind him. No better summary of this experience could perhaps be found than that contained in one of the Nashville papers. Here is the account:

Horatio Alger would have written about "Johnny" Connors and never strayed from fact. The literal romance of this safety expert, who set out at the age of fifteen as a conductor to support a widowed mother and six children, and who rose through the ranks to lead his associate employees to the safety championship of the world, was disclosed by H. A. Davis, superintendent of railway.

Fifteen-year-old Johnny Connors asked the Nashville Railway & Light Company for a job in May, 1903. He was just out of short pants and the conductor's uniform issued to him almost hid him from view. He mounted the rear end of an old Wharf Avenue street car, and one week later took his first pay envelope to his mother and her children. Later he "ran" on the High Street and the West End lines. Years passed, and he became foreman of the carhouse in 1920.

This limited success gave him the idea that he could not be kept down if he could only overcome the handicap of lack of education. He was then working twelve hours a day, but, seized with ambition and determination, he bought books and enrolled in Watkins night school. Five nights of every week he burned oil there. Also he studied his job and the railway industry at large.

In 1923 Mr. Davis called him to the main office and made him safety director. At once he started a school for safety and courtesy, in which all motormen, conductors and other railway and electric power operators enrolled. Regularly, under the tutorship of Mr. Connors, these employees met—to study methods of protecting human life and property and to establish a better relationship between railway men and their riders. Attendance and interest were pronounced. Results were awaited.

In the first year, 1923, street cars operated only two days without any semblance of an accident. They managed to travel 3,750 miles per accident. School "kept," and in 1925 Mr. Connors led his associate operators to the safety record of the world, operating 66 absolutely perfect days and travel-

ing more than 1,000,000 miles without an accident. The feat has since been heralded throughout the world. In 1926, to date, street cars in Nashville have equaled last year's record for the equivalent period.

W. C. Sparks Leaves Operating Post

W. C. Sparks, for sixteen years vice-president and general manager of the Rockford & Interurban Railway, Rockford, Ill., has resigned as general manager, but will continue with the company as vice-president and a director. It is expected that Adam Gschwindt, receiver for the company, will assume duties of the managership.

Mr. Sparks was graduated from the civil engineering school of the University of Indiana in 1900 and later entered the government service in the Philippines, where he remained for nearly two years. On his return he entered the engineering department of the Union Traction Company of Indiana as chief engineer, but he resigned in 1910 to become general manager of the Rockford & Interurban Railway. In 1916 he was made vice-president.

In 1919 Mr. Sparks was elected president of the Illinois Electric Railway Association. He was also active in the affairs of the Central Electric Railway Association.

George L. Hanscom, for the last 25 years employed by the York Utilities Company, Sanford, Me., in various capacities, has been promoted from assistant superintendent to superintendent.

William Greenwood has become affiliated with the York Utilities Company, Sanford, Me., as master mechanic in charge of shops and power houses. He was formerly with the Westinghouse Electric & Manufacturing Company.

V. Watlington, who acted as managing director of the English Electric Company, during the absence of P. J. Pybus on sick leave, has been appointed managing director of the company.

Obituary

Frank G. Hart, superintendent of transportation for the Bloomington & Normal division of the Illinois Power & Light Company, died on April 21. Mr. Hart entered the service of the old Bloomington & Normal horse car system in 1894. He served with that company continually until 1903. In that year he resigned, but in 1907 he reentered the service under M. G. Linn, then manager of the Bloomington-Normal property, and served under the succeeding managers, D. W. Snyder and E. O. Brown. He was made superintendent of transportation in 1922, following the death of Charles L. Richards, and served in that capacity since then. Mr. Hart was well known throughout the company organization.

William J. Moody, a director of the Corning & Painted Post Street Railway, Corning, N. Y., and the Elmira, Corning & Waverly Railroad, Waverly, N. Y., died on April 26.

Manufactures and the Markets

News of and for Manufacturers—Market and Trade Conditions
A Department Open to Railways and Manufacturers
for Discussion of Manufacturing and Sales Matters

Chicago Surface Lines Places Orders for 100 New Cars

The bodies of the 100 new multiple-unit cars being purchased by the Chicago Surface Lines will be built by three companies, deliveries to begin in September. Contract for 34 of them was awarded to the Cummings Car & Coach Company of Paris, Ill., 33 to the J. G. Brill Company of Philadelphia and 33 to the St. Louis Car Company of St. Louis.

The cars are of practically the same design throughout as the 100 multiple-unit cars purchased in 1924 and described in the ELECTRIC RAILWAY JOURNAL, issue of Nov. 15, 1924, page 837. They are designed for multiple-unit operation, giving them the maximum flexibility for train service or single unit two-man or one-man operation. Double-end equipment permits them to be operated on lines having stub terminals. National Pneumatic doors and the interlocking door and car control, automatic exit doors and Safety Car Devices apparatus are used. Their weight complete is 41,000 lb. The contract for motors is divided between General Electric No. 275 and Westinghouse 535, two motors being provided per car. Contracts for principal items of equipment awarded other than those mentioned above are as follows:

Trucks (Stucki side bearings)...J. G. Brill
Wheels .....Illinois Steel Company
Axles .....Carnegie Steel Company
Control equipment.....General Electric
Motors:
67 cars .....General Electric
33 cars .....Westinghouse
Door mechanism .....National Pneumatic
Air compressor .....General Electric
Rattan seat equipment.....St. Louis Car
Couplers ..... Ohio Brass Company
Heater equipment ..... Consolidated Car Heating Company
Ventilators .....Railway Utility
Signs .. Electric Service Supplies Company
Single-stroke bell and buzzer equipment.. Consolidated Car Heating Company
Curtains ..... Railway Curtain Company
Registers .....International Register
Thermostat equipment .. Railway Utility
Trolley catchers . Trolley Supply Company
Headlights ..... Trolley Supply Company
Sand traps.....Electric Service Supplies

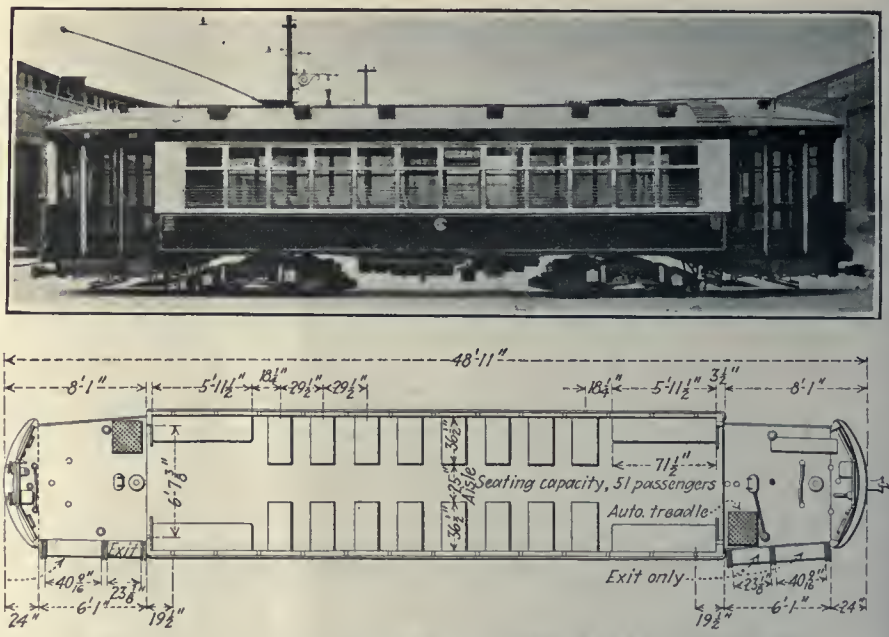
With the delivery of these cars Chicago Surface Lines will have added 445 new cars to its equipment in the past three years. Including this equipment the system will have 3,639 cars, with a total seating capacity of 160,000.

Alliance Specifies Haskelite

Haskelite has been specified for the interior trim on eight passenger interurban cars ordered by the Stark Electric Company, Alliance, Ohio, on March 13 from the Cincinnati Car Company. Specifications on these cars were published in the issue of ELECTRIC RAILWAY JOURNAL for April 17, 1926.

English Electric Anticipates Good Year

No dividends were declared on the ordinary shares of the English Electric Corporation, although profits for the year were £194,953. A reduction of £68,827 out of the earnings of the previous year occurred, this falling off being said by the directors to be occasioned by acute world competition in electrical and mechanical machinery. Unsettled conditions in certain foreign



Type of 100 New Cars Just Ordered for Chicago Will Be Similar to Those Now in Service on the Surface Lines

markets reduced the volume of foreign orders of the English company.

An improvement has been noticeable in the last few months and the company has booked a much larger volume of business than at any time in the immediate past. The unexecuted orders on its books already exceed the entire output of 1925, it is reported.

Electrification in Italy

Railway electrification in Italy took another step forward with the opening of the newly electrified railway between Sestri Levante and Spesia. The total length of this improvement is 27 miles, and it marks the final step in the electrification of the line from Modane on the French frontier to Sestri Levante, a distance of 225 miles. It is reported that within a few months electric operation will be extended to Leghorn by the conversion of another section 58 miles in length. At present the total length of electrified line in Italy is 552 miles.

New Gasoline Produced by Texas Company

A "new and better" gasoline has just been announced by the Texas Company. It has been made possible in commercial quantities through the Holmes-Manley process, which is a patented method of refining controlled by the manufacturers. Among the advantages claimed for it are the fact that it vaporizes instead of merely atomizing, because of its higher volatility and freedom from heavy ends, that it is a dry rather than a wet gas and that it provides a quicker start and pickup, more miles per gallon, relief from carbon knock and better lubrication. All Texaco tanks and pumps are now supplied with the new gasoline.

Tucson Gets New Buses

Delivery has just been made of two pay-enter city type buses to the Tucson Rapid Transit Company, Tucson, Ariz. The buses, which were constructed by the Garford Motor Truck Company, Lima, Ohio, are designed to enhance the streamline effect, as practically all body lines have been carried across the doors, as shown in the accompanying illustration. The buses will seat 21 passengers and will augment the coordinated transportation service at present provided in the city of Tucson.

$14,122,000 Profit for Westinghouse

Sales of $166,008,800 Largest in History of the Company—Five-Year Comparison

The volume of sales billed by the Westinghouse Electric & Manufacturing Company last year shows an increase over the previous year, notwithstanding that the South Philadelphia Works, devoted to the manufacture of large apparatus such as land turbines, condensers, equipment for merchant ships, battleships, cruisers and other naval vessels, was insufficiently loaded with business and operated at a loss for the year. The value of new orders booked during the year also shows a substantial increase over the previous year. After adjustments, the value of unfilled orders at the end of the fiscal year was $55,163,247. A condensed comparative statement of operations for the past five years follows:

	Year Ended March 31				
	1926	1925	1924	1923	1922
Gross earnings—sales billed	$166,006,800	$157,880,292	$154,412,918	$125,166,115	$99,722,026
Cost of sales	151,711,929	144,242,065	137,006,280	111,694,832	93,461,846
Net manufacturing profit	$14,294,861	$13,638,227	$17,406,638	$13,471,283	$6,260,180
Other income	2,295,363	4,203,179	1,336,438	1,296,601	2,673,809
Gross income from all sources	$16,590,224	$17,841,406	$18,743,076	$14,767,884	$8,933,989
Interest charges, etc	2,468,223	2,517,042	2,617,773	2,504,398	3,096,600
Net income available for dividends and other purposes	$14,122,001	$15,324,364	$16,125,303	$12,263,486	$5,837,389

The statement of the profit and loss account follows:

Surplus as of March 31, 1925		$51,199,324
Surplus—George Cutter Company, July 1, 1925		82,764
Net income for the year		14,122,000
Total		$65,404,090
Deductions:		
Dividends:		
On preferred stock	$319,896	
On common stock	9,154,615	
Total dividends	$9,474,511	
Additional reserve for federal taxes—1917–1921	4,000,000	
Miscellaneous—Net	214,182	
Total deductions		13,688,693
Surplus March 31, 1926		$51,715,396

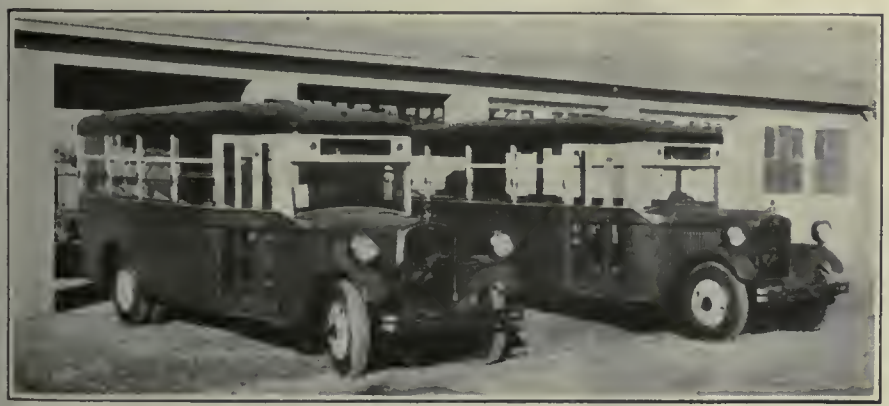
Property and plant account were increased during the year mainly due to the equipment of new buildings erected during the previous year. An increase in investments over the previous year is almost wholly accounted for by the additional capital paid into the Westinghouse Commercial Investment Company and Westinghouse Acceptance Corporation. All of the outstanding capital stocks of these companies are owned by the Westinghouse Electric & Manufacturing Company, but because of the nature of their business, their operations are not included in the Westinghouse report.

The Westinghouse Commercial Investment Company was incorporated for the purpose of increasing the distribution of Westinghouse products by supplementing its system of distributing agents with its own jobbing houses advantageously located throughout the United States. The Investment company declared a dividend of 6 per cent on its capital stock as of Dec. 31, 1925.

The Westinghouse Acceptance Corporation was created to assist Westinghouse distributing agents and users of Westinghouse products, by financing sales on the installment plan. The Acceptance Corporation operates on a basis similar to that of other financing corporations and has already proved of valuable assistance in securing business. It has been in operation less than a year and satisfactory profits are anticipated.

The export business of the Westinghouse company, excepting for Canada, is conducted through the Westinghouse Electric International Company. Final settlement was received during the year on the contract for the electrification of the Chilean State Railways from Santiago to Valparaiso. According to Chairman Tripp competition in foreign markets continues to be keen and the outlook for the ensuing year shows no marked change.

The average number of employees during the year was 46,427. The total of all payrolls for the year was $74,144,607, equal to about 49 per cent of the cost of sales billed.



Two 21-Passenger Buses Purchased by Tucson

Metal, Coal and Material Prices

Metals—New York	May 18, 1926
Copper, electrolytic, cents per lb	13.875
Copper wire, cents per lb	16.00
Lead, cents per lb	7.75
Zinc, cents per lb	7.22
Tin, Straits, cents per lb	61.50
Bituminous Coal, f.o.b. Mines	
Smokeless mine run, f.o.b. vessel, Hampton Roads, gross tons	$4.875
Somerset mine run, Boston, net tons	1.975
Pittsburgh mine run, Pittsburgh, net tons	1.825
Franklin, Ill., screenings, Chicago, net tons	1.925
Central, Ill., screenings, Chicago, net tons	1.70
Kansas screenings, Kansas City, net tons	2.50
Materials	
Rubber-covered wire, N. Y., No. 14, per 1,000 ft	$6.25
Weatherproof wire base, N.Y., cents per lb.	18.00
Cement, Chicago, net prices, without bags	2.10
Linseed oil (5-bbl. lots), N.Y., cents per lb.	11.20
White lead in oil (100-lb. keg), N. Y., cents per lb	15.00
Turpentine (bbl. lots), N. Y., per gal	$0.86

Rolling Stock

Milwaukee Electric Railway & Light Company, Milwaukee, Wis., has been recommended by the Railroad Commission to purchase 70 or 75 additional cars for use in that city to augment present service.

Wilkes-Barre Railway, Wilkes-Barre, Pa., has placed an order with the J. G. Brill Company, Philadelphia, Pa., for ten 30-ft. 11½-in. closed motor cars mounted on Brill 177-E-1 trucks.

Dallas Railway, Dallas, Tex., has placed an order with the American Car Company for 30 45-ft. 8-in. double-end motor cars mounted on Brill 177-E-1 trucks.

Aurora, Elgin & Fox River Electric Company, Aurora, Ill., expects delivery in August of eight double-end, single-truck, safety cars ordered from the St. Louis Car Company on April 23. These cars are to be of steel construction and will seat 32 passengers. Some of the principal specifications are given here:

Weight:	
Car body	8,200 lb.
Trucks	4,500 lb.
Equipment	5,250 lb.
Total	18,050 lb.
Length over all	28 ft. 0 in.
Truck wheelbase	8 ft. 0 in.
Width over all	7 ft. 9½ in.
Height, rail to trolley base	9 ft. 10⅞ in.
Body	Steel
Interior trim	Cherry
Headlining	Agasote
Roof	Arch
Air Brakes	Westinghouse
Axles	Heat-treated
Bumpers	Channel, 5 in.
Car signal system	Faraday
Car trimmings	Polished bronze
Compressors	Westinghouse
Control	K-63 double end
Couplers	St. Louis Car Company draw bar
Curtain fixtures	Curtain Supply Company
Curtain material	Pantasote
Destination signs	Hunter
Door-operating mechanism	St. Louis Car Company
Fare boxes	Cleveland No. 5
Fenders	St. Louis Car Company
Gears and pinions	General Electric
Hand brakes	St. Louis Car Company drop handle
Heater equipment	Consolidated Car Heating
Headlights	Golden Glow S. M. 95
Journal boxes	St. Louis Car Company
Lightning arresters	G. E. aluminum cell
Motors	Two-G.E. 265-A, 35 hp., inside hung
Sanders	St. Louis Car Company "Weather-proof"
Sash fixtures	St. Louis Car Company
Seats	St. Louis Car Company R-50, reversible
Seating material	Genuine leather
Slack adjuster	St. Louis Car Company screw type
Springs	St. Louis compound hell-elliptic
Step treads	Feralun
Trolley catchers	Keystone
Trolley base	General Electric
Trolley wheels	General Electric
Trucks	St. Louis Car Company No. 7
Ventilators	St. Louis Car Company, "Peerless"
Wheels	26-in. diameter rolled steel
Special devices, etc.	Root track scrapers

British Columbia Electric Railway, Vancouver, B. C., has ordered two four-cylinder parlor car chassis from the Fageol Motors Company of California.

Southern Indiana Gas & Electric Company, Evansville, Ind., will spend $175,000 for thirteen new large high-speed cars which will be delivered and ready for use by Oct. 1. The new units will be of the latest type safety cars. Six are designated as light-weight double-end double-truck cars. To defray the expense of the new equipment the company has been granted permission by the Indiana Public Service Commission to issue $750,000 of 6.6 per cent preferred stock.

Los Angeles Motor Bus Company, a subsidiary of the Los Angeles Railway and the Pacific Electric Railway, has placed an order for six double-deck buses with the Fageol Motors Company, Oakland, Cal. Delivery of the new unit is expected to be made shortly.

Birmingham Electric Company, Birmingham, Ala., has just purchased sixteen new electric street cars of the most modern design for its lines in Birmingham, at a total cost of $250,000. The cars are expected to be delivered about Oct. 1, 1926. Each of these cars has a seating capacity of 62 passengers. According to General Manager Pevear new cars will be practically the same as those now in use on the East Lake and South East Lake lines, having the large side-door entrance and front exit, and many new features including standard safety devices. Heavy upholstered seats and full spring cushions have been specified. Noiseless gears and motors will be in use and rubber-tiled floors are included in the detailed specifications.

Northern Ohio Traction & Light Company, Akron, Ohio, has just received one Differential car from the Differential Steet Car Company of Findlay, Ohio. This is a trail car and will be used on trackwork and for cinder service.

Municipal Railway of St. Petersburg, St. Petersburg, Fla., has included in an improvement program eight new double-truck cars at a cost of $100,000. The new cars are to be of the same size as the largest of those now in use. This is a further expenditure of bond moneys provided for betterments in public utilities by the electors who sanctioned an issue of more than $200,000 last November.

Track and Line

Sioux City Service Company, Sioux City, Iowa, has started to relay new street car rails on Dubuque Street between Seventh and Eleventh Street. Work is being done at this season because the city has decided to pave the street. The new rails will be laid in a concrete monolithic base.

Pacific Northwest Traction Company, Everett, Wash., plans the construction of an overhead crossing on the North Trunk road, a link in the new Pacific Highway between Ronald and Foy Stations. The company will ask for alternative bids on a steel girder span and frame truss. The new trestle will be 125 ft. long and have a clearance of 14 ft. over interurban rails. Plans also include concrete abutments.

Power Houses, Shops and Buildings

New York Rapid Transit Corporation, Brooklyn, N. Y., operating subsidiary of the Brooklyn-Manhattan Transit Corporation, is inquiring for 25 cranes for its Coney Island shops.

Georgia Railway & Power Company, Atlanta, Ga., has obtained a permit for the construction of a new carhouse in Atlanta, at a cost of $90,000. The building will be of brick and concrete with metal roof. Construction will start immediately.

Trade Notes

Graybar Electric Company, New York, N. Y., has announced the opening of three additional distributing branches to be located in the following cities: Reading, Pa.; Dayton, Ohio, and Hartford, Conn. It is expected that these new branches will be in operation this spring.

Timken Roller Bearing Service & Sales Company, has announced the closing of its Baltimore, Md., office, formerly located at 33 Cathedral Street. The service requirements of Timken customers in this territory will be supplied through the Richmond, Pittsburgh and Philadelphia branches hereafter.

E. Hamilton Berry, manager of the electric railway department of the Philip Carey Manufacturing Company, Cincinnati, Ohio, has resigned from that office. He has held this position since November, 1925, and prior to that time was engineer of maintenance of way Cincinnati Traction Company for many years.

Fred T. Rumball, formerly manager of the Kansas City branch of Timken Roller Bearing Service & Sales Company, has been promoted to the position of sales engineer, automotive division, of the Timken Roller Rearing Company. Mr. Rumball will have his headquarters in Cleveland, with Edgeley W. Austin, assistant manager of sales. The position of branch manager at Kansas City will be filled by J. M. Carey, who has been promoted from the position of salesman under Mr. Rumball.

Charles E. Parsons has recently been made general sales manager of the Auto Body Company, Lansing, Mich. Mr. Parsons has had long experience in the automotive industry, having served for many years with the Fisher Body Corporation and later becoming vice-president of the Ternstedt Manufacturing Company.

Henry Eggelhos was recently appointed exclusive representative for the eastern half of Texas by the Uehling Instrument Company of Paterson, N. J. Mr. Eggelhos' address is P. O. Box 945, Dallas, Tex.

New Advertising Literature

Nichols-Lintern Universal Lanterns is the title of a booklet recently issued by the Nichols-Lintern Company, Cleveland, Ohio. This booklet contains a complete description of the N-L industrial lanterns and illuminated signs, rapidly coming into wide use in steel mills, factories and electric railways.

Carnegie Steel Company, Pittsburgh, Pa., has issued a booklet which contains complete information, life and cost data and illustrations of Carnegie steel cross ties. The booklet states that these ties are suitable for electric and steam railways, mines, quarries, plantations and portable tracks.



25 Modern Cars for Providence, R. I.

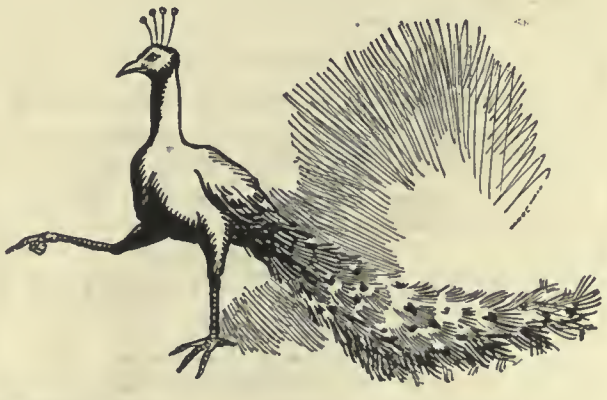


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"Peacock Type G-14"
is their hand-brake choice!

Hand Brakes for modern cars, city or interurban, light-weight or heavy-weight, are all provided for in the Peacock line. Consult us on your braking problems.



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Street Car Type Motor Coach, Complete,

$3815

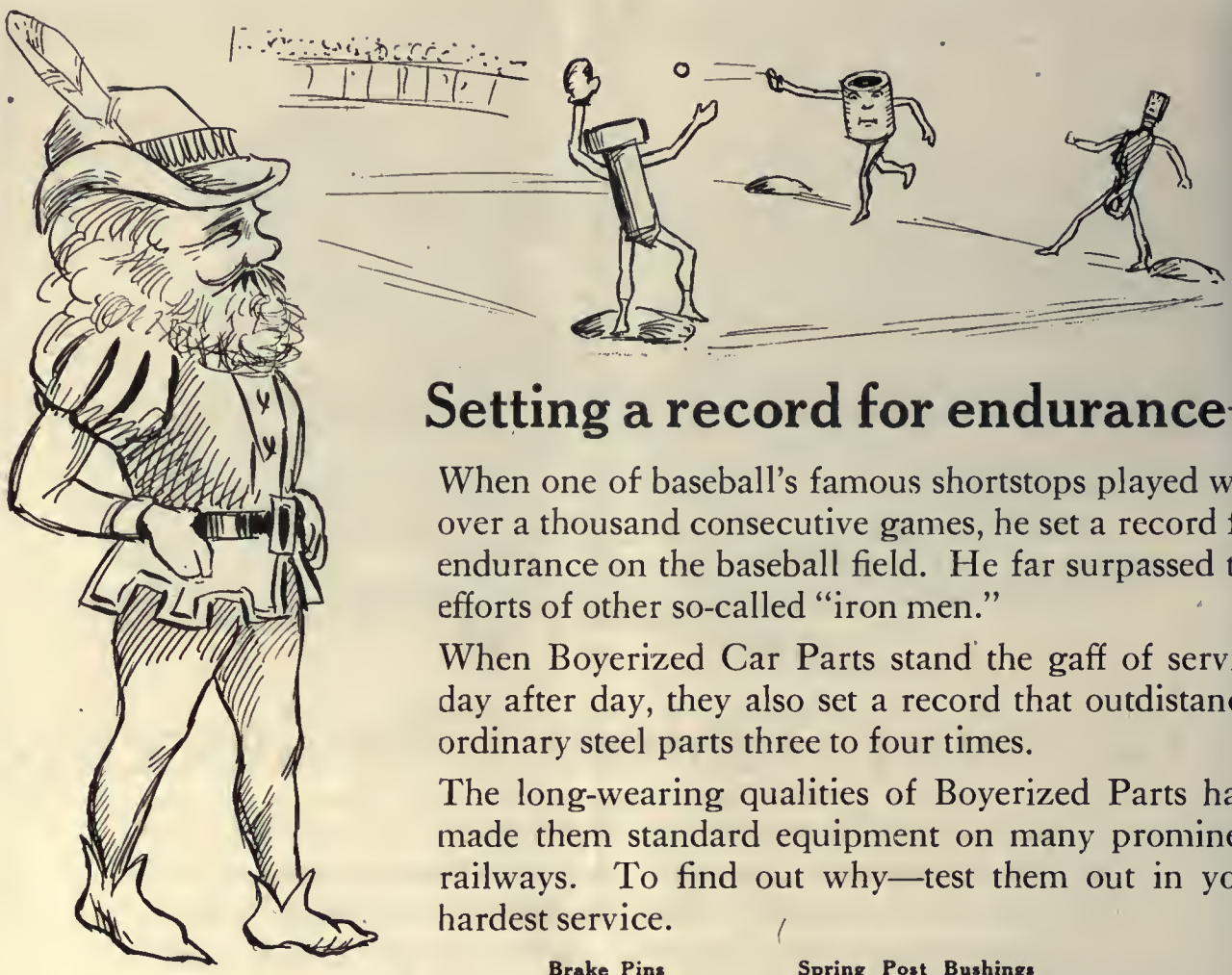
F. O. B. Detroit

Furthermore, Graham Brothers Motor Coaches are: Attractive, safe, dependable and economical in operation.

GRAHAM BROTHERS
Evansville – DETROIT – Stockton
A DIVISION OF DODGE BROTHERS, INC
GRAHAM BROTHERS (CANADA) LIMITED – TORONTO, ONTARIO

GRAHAM BROTHERS MOTOR COACHES

SOLD BY DODGE BROTHERS DEALERS EVERYWHERE



Setting a record for endurance—

When one of baseball's famous shortstops played well over a thousand consecutive games, he set a record for endurance on the baseball field. He far surpassed the efforts of other so-called "iron men."

When Boyerized Car Parts stand the gaff of service day after day, they also set a record that outdistances ordinary steel parts three to four times.

The long-wearing qualities of Boyerized Parts have made them standard equipment on many prominent railways. To find out why—test them out in your hardest service.

"Boyerize to Economize"

Brake Pins	Spring Post Bushings
Brake Hangers	Spring Posts
Brake Levers	Bolster and Transom Chafing Plates
Pedestal Gibs	Manganese Brake Heads
Brake Fulcrums	Manganese Truck Parts
Center Bearings	Bushings
Side Bearings	Bronze Bearings

BEMIS CAR TRUCK COMPANY

Electric Railway Supplies

SPRINGFIELD, MASS.

REPRESENTATIVES:

Economy Electric Devices Co., Old Colony Bldg., Chicago, Ill.
F. F. Bodler, 903 Monadnock Bldg., San Francisco, Cal.
W. F. McKenney, 54 First Street, Portland, Ore.
J. H. Denton, 1328 Broadway, New York City, N. Y.
A. W. Arlin, 722 Pacific Electric Bldg., Los Angeles, Cal.



The McArthur Turnbuckle



A few of the Cleveland Railway Company's magnificent fleet of SAFEWAY Six-Wheel Double Deckers which handle 70 per cent of its city bus business.

The Verdict of the Cities

When the Detroit Motor Bus Company replaced its 4-wheel equipment with 37 Double Deck and 98 Single Deck SAFEWAY Six-Wheelers—

—And Cleveland, with an unusually difficult downtown transportation problem, followed with 40 Double Deckers—

—And Kansas City, of mountainous hauls demanding miracles of performance, took 18 Double Deckers and 5 Parlor Cars—

—And New York, Boston, St. Louis, Cincinnati, Washington, Pittsburgh, Montreal and Akron were added to the list—

American cities of the first-class gave an impressive verdict, stamped with the seal of public approval of performance, for the SAFEWAY Six-Wheel principles of construction and design.

These great municipalities demanded in common that the equipment selected would give—

—Maximum load—ease of handling for quick getaway to move with traffic—economy of operation and maintenance—comfort to the public—*and Safety Always*. These were the paramount factors to be considered.

Their expert traffic engineers, after the most gruelling tests it was possible to devise' selected the SAFEWAY Six-Wheeler.

The exclusive features of these sturdy, powerfully motored, absolutely safe and luxuriously comfortable 63-passenger Double Deckers and 29-passenger City Type SAFEWAY Six-Wheelers met every requirement, the year around, of modern city transportation.

The cities have given their verdict. The SAFEWAY Six-Wheeler has solved their problem. It is the answer to yours.

Specifications all types and delivery dates on request. See our exhibit at the A. R. A. convention, Atlantic City, June 9-16.

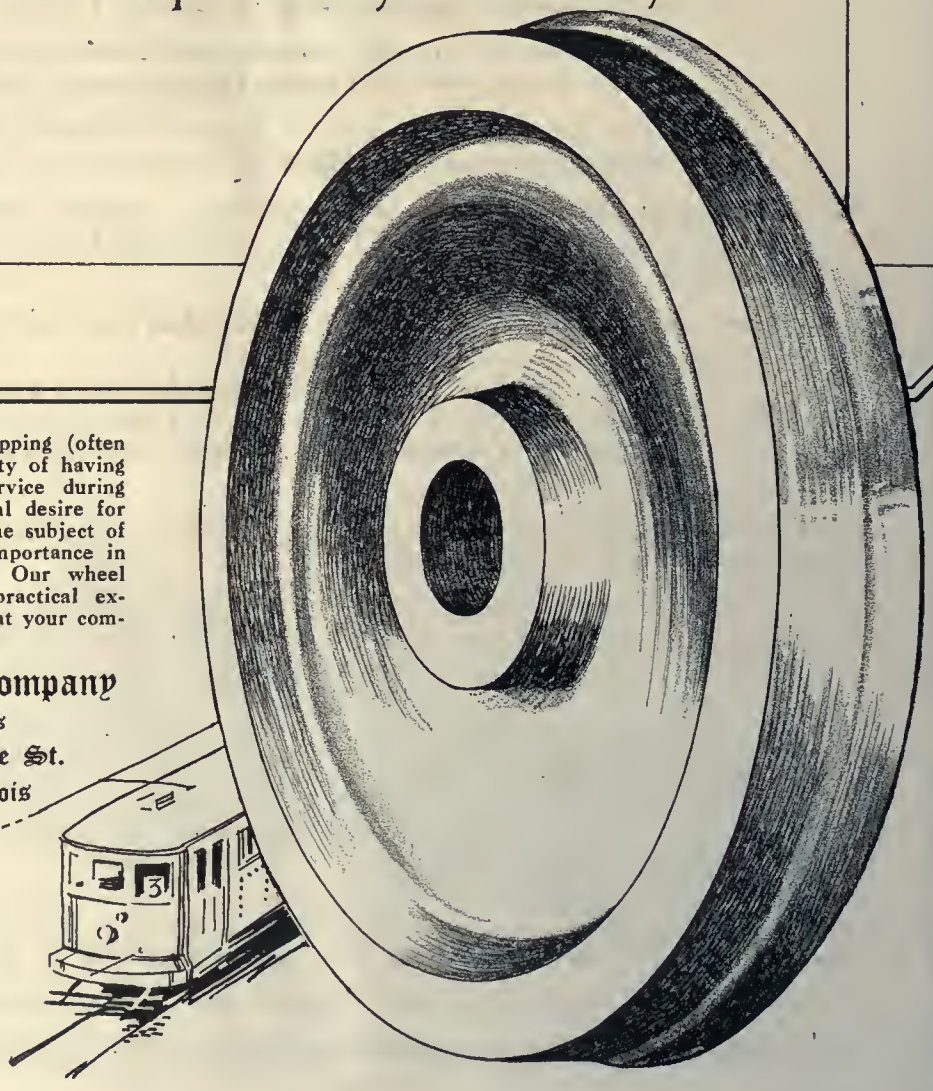
THE SAFEWAY SIX-WHEELER

THE SIX WHEEL COMPANY, 1800 W. LEHIGH AVENUE, PHILADELPHIA, PA.

Manufacturers of Intercity, De Luxe, Single, and Double Deck City Type Six-Wheel Coaches

In the final analysis, the success of a wheel in electric railway service is governed by the manner in which it measures up to three requirements: [1] Safety [2] Dependability [3] Economical Mileage Cost.

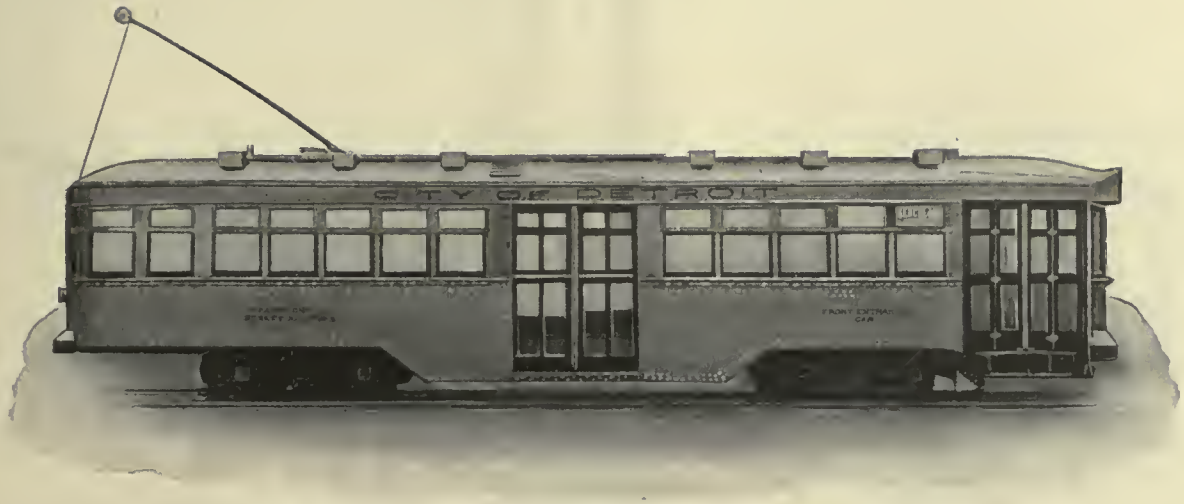
Gary Wheels, being *homogeneous* in nature, *wrought steel* in construction and of the *multiplied mileage* type, meet these essentials in a particularly effective way.



Frequent starting, quick stopping (often in emergencies), the necessity of having maximum equipment in service during rush periods, and the natural desire for low operating costs, make the subject of Wheels one of particular importance in the electric railway field. Our wheel specialists, with years of practical experience to guide them, are at your command.

Illinois Steel Company

General Offices
208 So. La Salle St.
Chicago, Illinois

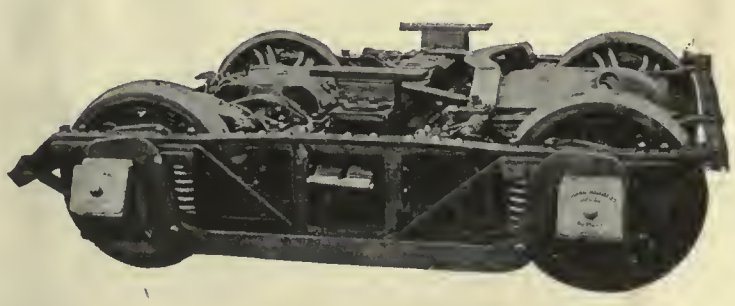


One hundred and twenty-five cars of this type furnished the Department of Street Railways, City of Detroit

Modern Cars

Light weight cars of all types for city and interurban service

TWENTY-FIVE YEARS' experience in building fine cars, and twenty-five years' continual contact with the needs of progressive railways enables this company to meet every need of today's conditions. Our engineering department will co-operate with you in working out designs and submitting proposals, or we will gladly quote on your plans and specifications.



MC62 Light weight truck for low car bodies, city or interurban service. Inside hung equalizer bars.

CUMMINGS CAR AND COACH COMPANY

Successor to McGuire-Cummings Mfg. Co.

111 W. Monroe Street

CHICAGO

BRILL

Create an air of progressiveness



New cars! Better service! Something to show that the town's "getting ahead." Naturally local papers are only too eager for news like that. It's "popular stuff,"—and the best kind of business building publicity any electric railway could possibly desire.

...an be done with new cars

Clearly progress is the keynote today. It sounds in industry, it sounds in business and it sounds in the private life of the individual.

Furthermore it has sounded lustily in the field of transportation. Faster service, more comfort, a real effort to please and attract passengers—this recipe has never failed to produce results.

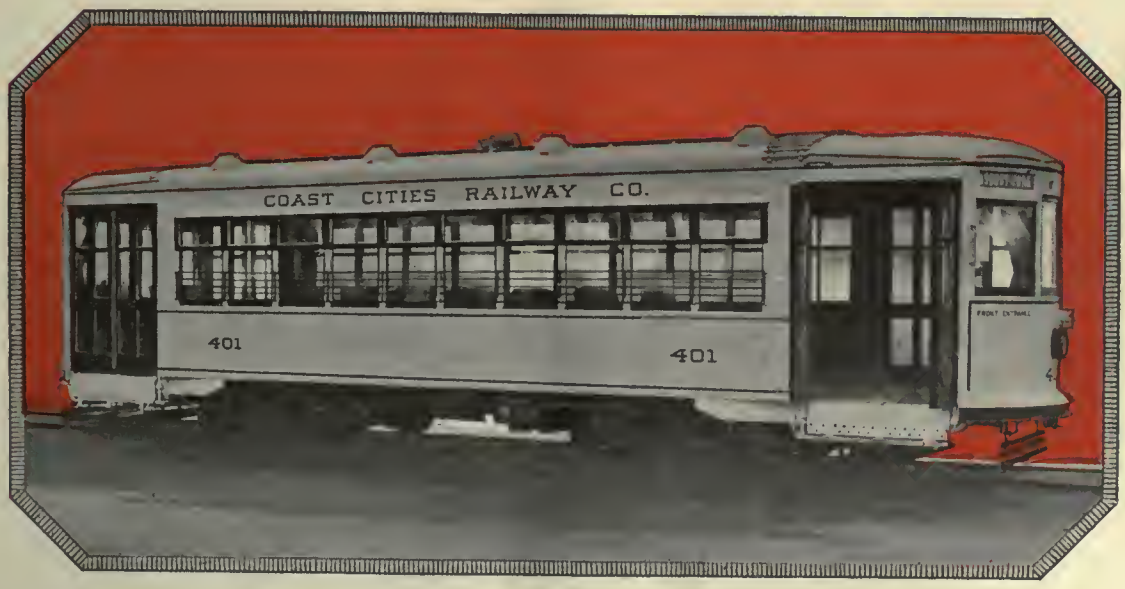
To create this air of progressiveness, to keep step with community and national development as a whole, is the necessity facing the electric railway industry today.

It can be done, and it has been done with new, modern, passenger-attractive cars.

A sufficient number of well established and successful properties have already "taken the medicine" to prove its efficiency beyond doubt.

And in every instance where this air of progressiveness has been created through the installation of speedy, comfortable and handsome modern cars, the results have been far reaching in their promotion of healthy business conditions for the railway, a better spirit among its employees, and a friendly feeling of goodwill on the part of the public. At the same time because of the greater efficiency of modern equipment, operating expenses have been materially decreased, and the resulting gain in net income more than pays for the cars.

THE J. G. BRILL COMPANY
PHILADELPHIA, PA.
AMERICAN CAR CO. ST. LOUIS MO. — G. C. KUHLMAN CAR CO. CLEVELAND, OHIO. — WASON MANF'G CO. SPRINGFIELD, MASS.



The creation and maintenance of car advertising space values requires the same degree of highly specialized knowledge as the construction and maintenance of railroads. Such tasks should be delegated only to those of widest experience and longest record of success.



Barron G. Collier
INCORPORATED
CANDLER BLDG. NEW YORK

Nuttall

Standard Helical Gears Save the Motors



That shock of acceleration that is inevitable with spur gearing springs bolts, strains bearings, loosens insulation, cuts gear life and motor life, and piles up maintenance.

The motors suffer; body work suffers and soon begins to creak.

Nuttall BP Helical Gears will stop this profit leak. The meshing of the teeth is like the turning of a screw—smooth, vibrationless, noiseless, shockless. There is no grinding and no chattering.

We'll be glad to cooperate in *proving* their economy on your cars. Consult us.

Write for our Helical Gear Book

R.D. NUTTALL COMPANY
PITTSBURGH PENNSYLVANIA

All Westinghouse Electric & Mfg. Co. District Offices are Sales Representatives in the United States for the Nuttall Electric Railway and Mine Haulage Products. In Canada: Lyman Tube & Supply Co., Ltd., Montreal and Toronto.

MEMBER AERA



ESPECIALLY CHOSEN FOR YOUR EQUIPMENT

U.S.G. BRUSHES are never "generally recommended"; your operating conditions, type and condition of equipment, kind of service and all other details are first carefully considered by trained brush engineers *before* the grade of U.S.G. brush to be applied is decided upon.

This results in many benefits for you. You get better commutation, longer life of your motors, longer brush life and in general, better all-around service. Perfectly operating brushes reduce costs of application, replacement and repairs to motors. Therefore, it is to your advantage to choose those which give the longest and most satisfactory life and this can only be accomplished by having your individual needs carefully studied before the brushes are applied.

USG

Brushes fill the bill

Manufactured by

The United States Graphite Co.
Saginaw, Michigan

New York Philadelphia Pittsburgh
Chicago St. Louis San Francisco



HASKELITE

for Headlining and Interior Trim in Old Cars

THE Milwaukee Electric Railway & Light Company has long been a regular user of HASKELITE for the reconstruction of old cars. A large recent order is evidence of the satisfaction which this material has given. It provides an unequalled finish for headlinings and interior trim.

When re-building or repairing old cars, why not take advantage of this ideal plywood and its steel faced companion PLYMETL? In addition to interior trim HASKELITE is being widely adopted for roofs, floors, ad racks, etc., while PLYMETL is the accepted standard for side panels, dashes, etc. These materials insure light weight and maximum strength, two of the most important factors in the modern car.

May we send you our blueprint booklet covering the uses of HASKELITE and PLYMETL in street car and bus construction?

HASKELITE MANUFACTURING CORPORATION
133 W Washington Street, CHICAGO, ILLINOIS

PLYMETL

ERJ5-22Gray

88% use "Tool Steel" gears

Questionnaire Replies

THE 1925 A. E. R. A. Equipment Committee sent out a questionnaire on spur and helical gearing. To this questionnaire there were 18 companies replied who controlled a total of 14,910 cars. The lineup of these companies on "Tool Steel" is as follows:

Exclusive Users—9 companies controlling 7943 cars.....53%
Part Users—6 companies controlling 5138 cars.....35%
} 88%

Non-Users—3 companies controlling 1829 cars.....12%

As you analyze the 1925 Equipment Committee report on the gear subject bear in mind that the basis information was obtained from companies where 88% of the cars were controlled by those who used "Tool Steel" gears and pinions, either exclusively or regularly.

The Tool Steel Gear & Pinion Co.,
Cincinnati, Ohio



The Standard of Quality TOOL-STEEL QUALITY GEARS AND PINIONS



Don't Overlook Opportunities

Men who regularly keep in touch with the market through other channels often overlook the many opportunities that are to be found in the

SEARCHLIGHT SECTION

For Every Business Want
"Think SEARCHLIGHT *First"*

0156



Cold Dinners

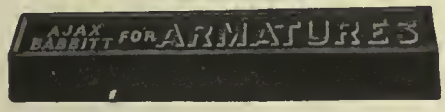
for *your* passengers?

Not if you use

AJAX

BABBITT *for* ARMATURES

keeps the rolling stock rolling



The Ajax Metal Company

Established 1880

PHILADELPHIA

NEW YORK CHICAGO BOSTON CLEVELAND

PANTASOTE

Trade Mark

Seat and Curtain Materials

There is no substitute for Pantasote

AGASOTE

Trade Mark

Roofing—Headlining—Wainscoting

The only homogeneous panel board

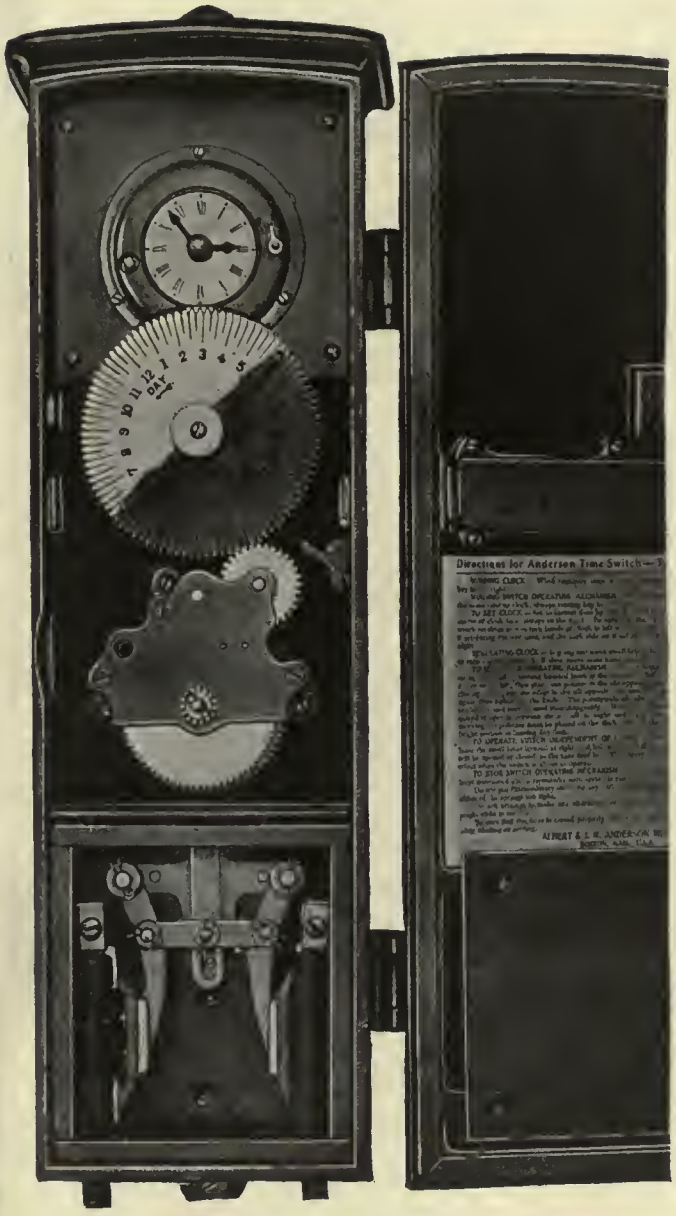
standard
for electric railway cars
and motor buses



The PANTASOTE COMPANY Inc.

At 46th Street 250 Park Avenue NEW YORK





Automatic Time Switches

If you are relying upon a Time Switch to do its work faithfully and continuously, if you must be absolutely sure that the Time Switch functions when and how you want it to, if you must be certain—then install an Anderson.

Every part of this Time Switch, including the clock is constructed under the same roof—and dependability is built in every part.

Hundreds of electric signs are controlled by Anderson's; Central Stations use them for street lighting, two-meter service and Automatic Substations. There are many other uses for these dependable Time Switches.

Bulletin No. 37 may suggest how you can profitably install an Anderson Time Switch.

Albert & J. M. Anderson Mfg. Co.

289-305 A St., Boston, Mass.

New York Philadelphia Chicago London, England

You're having brush trouble

CORRECT IT

USE LE CARBONE CARBON BRUSHES

They talk for themselves

COST MORE PER BRUSH
COST LESS PER CAR MILE

W. J. Jeandron
Hoboken Factory Terminal,
Building F, Fifteenth Street, Hoboken, N. J.

Pittsburgh Office: 634 Wabash Bldg.
Chicago Office: 1657 Monadnock Block
San Francisco Office: 525 Market Street
Canadian Distributors: Lyman Tube & Supply Co., Ltd., Montreal and Toronto

M-J Armature Babbitt





No less than twenty-five different grades of Babbitt have been successfully perfected in the More-Jones line, designed for various services and at varying prices. "Armature" for electric railways is the recognized standard. *Let us quote you.*

More-Jones Brass & Metal Co.
St. Louis, Mo.

MORE-JONES
QUALITY PRODUCTS

Griffin Wheel Company
410 North Michigan Ave.
Chicago, Ill.

GRIFFIN
F. C. S.
WHEELS

For Street and Interurban Railways

FOUNDRIES:

Chicago	Boston	St. Paul
Detroit	Kansas City	Los Angeles
Denver	Council Bluffs	Tacoma

The Hardware makes the line Hubbard makes the Hardware

HUBBARD

Hubbard and COMPANY
PITTSBURGH · OAKLAND, CAL. · CHICAGO

Rail Grinders
a type for every need

Atlas Arc Welder

Welding Supplies
Abrasives
(Wheels and Bricks)

Railway Track-work Co., Philadelphia

1162

WHARTON

Special Trackwork
Switches-Mates-Frogs-Crossings
incorporating the famous
Tisco Manganese Steel

Wm. Wharton Jr. & Co., Inc.
Easton, Pa.
Offices
Boston Chicago El Paso Montreal New York Philadelphia
Pittsburgh Salt Lake City San Francisco Scranton

Lorain Special Trackwork Girder Rails

Electrically Welded Joints

THE LORAIN STEEL COMPANY
Johnstown, Pa.

Sales Offices:
Atlanta Chicago Cleveland New York
Philadelphia Pittsburgh Dallas
Pacific Coast Representative:
United States Steel Products Company
Los Angeles Portland San Francisco Seattle
Export Representatives:
United States Steel Products Company, New York, N. Y.

SPECIALISTS

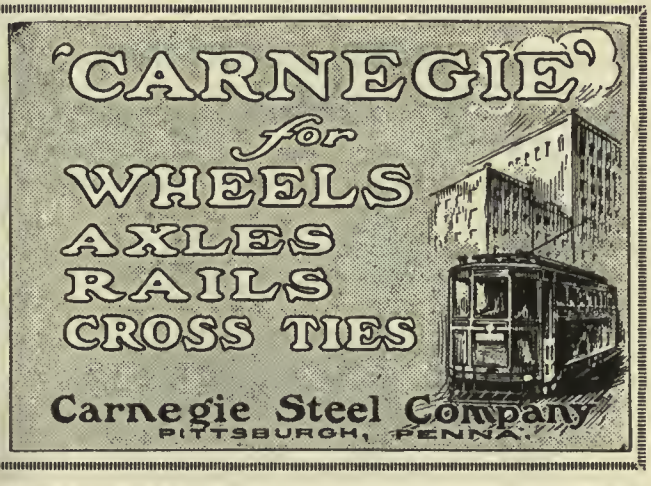
in the

Design and Manufacture

of

Standard—Insulated—and Compromise Rail Joints

The Rail Joint Company
61 Broadway, New York City



Bethlehem Products for Electric Railways

Tee and Girder Rails; Machine Fitted Joints; Splice Bars; Hard Center Frogs; Hard Center Mates; Rolled Alloy Steel Crossings; Abbott and Center Rib Base Plates; Rolled Steel Wheels and Forged Axles; Tie Rods; Bolts; Tie Plates and Pole Line Material.

Catalog Sent on Request

BETHLEHEM STEEL COMPANY, Bethlehem, Pa.

BETHLEHEM

Arc Weld Rail Bonds

AND ALL OTHER TYPES

Descriptive Catalogue Furnished

American Steel & Wire Company

Chicago Boston Pittsburgh
New York Cleveland Denver
U. S. Steel Products Co.
San Francisco Los Angeles Portland Seattle

The DIFFERENTIAL CAR



Standard on 60 Railways for

Track Maintenance
Track Construction
Ash Disposal
Coal Hauling
Concrete Meterials
Waste Handling
Excavated Materials
Hauling Cross Ties
Snow Disposal

Use These Labor Savers

Differential Crane Car
Clark Concrete Breaker
Differential Bottom Dump Ballast Car
Differential Car Wheel Truck and Tractor

THE DIFFERENTIAL STEEL CAR CO., Findlay, O.

B. A. HEGEMAN, Jr., President H. A. HEGEMAN, First Vice-Pres. and Treas.
F. T. SARGENT, Secretary W. C. PETERS, Vice-Pres. Sales and Engineering

National Railway Appliance Co.

Grand Central Terminal, 452 Lexington Ave., Cor. 45th St., New York.

BRANCH OFFICES

Munsey Building, Washington, D. C. 100 Boylston Street, Boston, Mass.
Hegeman-Castle Corporation, Railway Exchange Building, Chicago, Ill.

Tool Steel Gears and Pinions
Angio-American Varnish Co., Varnishes, Enamels, Etc.
National Hand Holds
Geneseo Paint Oils
Dunham Hopper Door Device
Garland Ventilators
Economy Electric Devices Co., Power Saving and Inspection Meters
Fort Pitt Spring and Mfg. Co., Springs
Cutler Hammer Electric Heaters
Flaxlinum Insulation
Anderson Slack Adjusters
Yellow Coach Mfg. Company—Single and Double-deck Buses
Walter Tractor Snow Plows

THE BABCOCK & WILCOX COMPANY

85 LIBERTY STREET, NEW YORK

Builders since 1868 of Water Tube Boilers of continuing reliability

BRANCH OFFICES

BOSTON, 49 Federal Street
PHILADELPHIA, Packard Building
PITTSBURGH, Farmers Deposit Bank Building
CLEVELAND, Guardian Building
CHICAGO, Marquette Building
CINCINNATI, Traction Building
ATLANTA, Candler Building
PHOENIX, ARIZ., Heard Building
DALLAS, TEX., 2001 Magnolia Building
HONOLULU, H. T., Castle & Cooke Building
PORTLAND, ORE., 805 Gasco Building

WORKS
Bayonne, N. J.
Barberton, Ohio

Makers of Steam Superheaters since 1898 and of Chain Grate Stokers since 1893

BRANCH OFFICES

DETROIT, Ford Building
NEW ORLEANS, 344 Camp Street
HOUSTON, TEXAS, 1011-13 Electric Building
DENVER, 435 Seventeenth Street
SALT LAKE CITY, 405-6 Kearns Building
SAN FRANCISCO, Sheldon Building
LOS ANGELES, 404-6 Central Building
SEATTLE, L. C. Smith Building
HAVANA, CUBA, Calle de Aguiar 104
SAN JUAN, Porto Rico, Royal Bank Building

Instantaneous Registration by the Passenger

ROOKE SYSTEM of fare collection

Meets every condition for all types of cars and buses. The stand device, as shown, adapts it to one-man uses—making register *portable* or *stationary*, at option. Handles nickels, dimes, quarters, or metal tickets, in *any combination*, FLEXIBILITY with CERTAINTY.



Rooke Automatic Register Company Providence, R. I.

Just what do you look for in the paint you buy?

Protection? Longevity? Appearance? Price?

There are paints made for every kind of surface—some good, some not so good—but, where you want real protection—long term of service—economy—paint that will stand up under conditions which rapidly break down ordinary paint, use VALDURA.

It is REAL paint that will give you dollar for dollar service.

AMERICAN ASPHALT PAINT CO.
844 Rush Street CHICAGO

TULC A LUBRICANT

We make a specialty of

ELECTRIC RAILWAY LUBRICATION

We solicit a test of TULC on your equipment

The Universal Lubricating Co.
Cleveland, Ohio
Chicago Representatives: Jameson-Ross Company, Straus Bldg.



Type R-11
Double Register

International Registers

Made in single and double types to meet requirements of service. For hand or foot, mechanical or electric operation. Counters, car fittings, conductors' punches.

The International Register Co.
15 South Throop Street, Chicago, Illinois



FARE
BOXES for BUSES

Let us tell you of this especially designed box for this class of service.

The Cleveland Fare Box Co.
4900 Lexington Ave., Cleveland, O.
Canadian Cleveland Fare Box Co., Ltd., Preston, Ontario

COIN COUNTING And Sorting Machines CHANGE CARRIERS Tokens

Kalamazoo Trolley Wheels

The value of Kalamazoo Trolley Wheels and Harps has been demonstrated by large and small electric railway systems for a period of thirty years. Being exclusive manufacturers, with no other lines to maintain, it is through the high quality of our product that we merit the large patronage we now enjoy. With the assurance that you pay no premium for quality we will appreciate your inquiries.



THE STAR BRASS WORKS
KALAMAZOO, MICH., U. S. A.

SEARCHLIGHT SECTION

USED EQUIPMENT & NEW—BUSINESS OPPORTUNITIES

UNDISPLAYED—RATE PER WORD:

Positions Wanted, 4 cents a word, minimum 75 cents an insertion, payable in advance.

Positions Vacant and all other classifications, 8 cents a word, minimum charge $2.00.

Proposals, 40 cents a line an insertion.

INFORMATION:

Box Numbers in care of any of our offices count 10 words additional in undisplayed ads.

Discount of 10% if one payment is made in advance for four consecutive insertions of undisplayed ads (not including proposals).

DISPLAYED—RATE PER INCH:

1 to 3 inches.....$4.50 an inch
4 to 7 inches.....4.30 an inch
8 to 14 inches.....4.10 an inch
Rates for larger spaces, on yearly rates, on request.
An advertising inch is measured vertically on one column, 3 columns—30 inches—to a page.

ERJ

WE OWN AND OFFER—

FOR SALE

ALL EQUIPMENT OF FORMER

NEW YORK & LONG ISLAND TRACTION CO.

which includes:

Birney Cars	Sweepers	Materials and Supplies	Electric Welder
Brill Cars	Snow Plows	Machine Shop Equipment	Electric Grinder
Southern Cars	Work Cars	Track Tools and Machinery	Concrete Mixer

RAILWAY MOTORS G. E.—58, 80, 202, 800
Westinghouse—56, 307, 508-A

Approximately 40 Miles of Track and Overhead Material, Etc.

FOR INFORMATION REGARDING THE ABOVE, WRITE OR WIRE

H. E. Salzberg Co., Inc., 50 Church Street, New York City
Railway Division

POSITIONS WANTED

AUDITOR with eleven years' continuous public utility experience railway, bus, gas and electric departments, desires position where promotion depends on ability. Now employed; can obtain release with reasonable notice. PW-904, Electric Railway Journal, Star Building, St. Louis, Mo.

CO-ORDINATION may mean an addition to your staff as well as to your equipment. Young man, engineering training having six years' experience in both operation and maintenance of buses, desires change. Qualified to take complete charge of bus department or subsidiary. Experienced in traffic, public relations, personnel, and costs. Midwestern location preferred. P.W.-908, Electric Railway Journal, Tenth Ave. at 36th St., New York.

PURCHASING AGENT: Positions wanted by man with over twelve years' experience purchasing supplies for street and interurban railways, electric, gas and water utilities, has also had several years department experience as storekeeper, thoroughly familiar with materials and sources of supply. Desires change for personal reasons, best references, correspondence invited. PW-909, Electric Railway Journal, Tenth Ave. at 36th St., New York.

POSITIONS WANTED

RAILWAY superintendent in charge of operation and maintenance of rolling stock track and overhead, an outstanding success in operating co-ordinated railway and coach service, desires change for personal reasons. Correspondence invited. PW-887, Electric Railway Journal, 7 So. Dearborn St., Chicago, Ill.

SUPERINTENDENT transportation. With a wide experience and successful record on city and interurban properties also co-ordination of rail and bus service, successful in handling labor, public relations, etc. Recognized as a transportation official of exceptional ability fully capable of getting results on any property. At present engaged. Personal reasons for desiring change. Best of references. Correspondence invited. Address PW-903, Electric Railway Journal, Guardian Building, Cleveland, Ohio.

Rotary Converters

1—500 kw., 600-v., 833 amp., 900 r.p.m., 6-ph., compound wound Westinghouse Rotary Converter, with 3—165 kva., 60-cy., single ph., 13200 v. primary transformers with A.C. and D.C. panels.

1—300 kw., 600-v., 500 amp., 1200 r.p.m., 6-ph., compound wound interpole Westinghouse Rotary Converter, with 3—110 kva., 60-cy., single ph., 13200-v. primary transformers with A.C. and D.C. panels.

GEO. SACHSENMAIER CO.
926 N. Third St., Philadelphia, Pa.

FOR SALE

STEEL TRAIL CARS

10—Light Weight 26 in. wheels. Seating capacity—62.
15—Birney Safety Cars, complete.
Detailed Specifications on Request

ELECTRIC TRACTION & BUS CO.
Times Bldg., New York.

FOR SALE

30 Birney Safety Cars

Brill Built

West. 508 or G. E. 264 Motors. Cars Complete—Low Price—Fine Condition.

ELECTRIC EQUIPMENT CO.
Commonwealth Bldg., Philadelphia, Pa.

POSITION VACANT

To Public Utility Publicity Men

Leading Public Utility Company wants to add to its Publicity Department a man who has had experience in this line of work with public utilities. Must be able to write newspaper articles, general descriptive matter and produce booklets, window cards, display ads, etc., about public utility services. State experience, salary expected, and send samples which will be taken care of and returned. Everything treated in strictest confidence. This is a good opening for a good young publicity man who knows something about public utilities. Address

P-907 Electric Railway Journal
1600 Arch St., Philadelphia, Pa.

WANTED

WANTED

20—General Electric 216 Motors.
28—General Electric 205 Motors.
62—Westinghouse 532-B Motors.
16—Railway Motors, 75 to 150 hp. each.

W-010, Electric Railway Journal
Tenth Ave. at 36th St., New York City

SAVE 30% TO 50% ON

RAILS-LOCOMOTIVES-CARS

Economy—Service
Quality—Reliability

HYMAN-MICHAELS COMPANY

Peoples Gas Bldg., Chicago

ST. LOUIS — DALLAS — LOS ANGELES
SAN FRANCISCO — PORTLAND — SEATTLE

WHAT AND WHERE TO BUY

Equipment, Apparatus and Supplies Used by the Electric Railway Industry with Names of Manufacturers and Distributors Advertising in this Issue

Advertising, Street Car
Collier, Inc., Barron G.

Air Brakes
Christensen Air Brake Co.
Westinghouse Air Brake Co.

Anchors, Guy
Elec. Service Supplies Co.
Ohio Brass Co.
Westinghouse E. & M. Co.

Appraisals
American Appraisal Co.

Armature Shop Tools
Elec. Service Supplies Co.

Asphalt Paint
American Asphalt Paint Co.

Automatic Return Switch Stands
Ramapo Ajax Corp.

Automatic Safety Switch Stands
Ramapo Ajax Corp.

Axles
Bemis Car Truck Co.
Bethlehem Steel Co.
Brill Co., The J. G.
Carnegie Steel Co.
Illinois Steel Co.
Johnson & Co., J. R.
National Ry. Appliance Co.
Westinghouse E. & M. Co.

Axles, Carbon Vanadium
Johnson & Co., J. R.

Axles, Front
Shuler Axle Co.

Axles (Front and Rear) Motor Truck and Passenger Car
Timken-Detroit Axle Co.,

Axles, Steel
Bethlehem Steel Co.
Carnegie Steel Co.
Johnson & Co., J. R.

Axles, Trailer, Motor Bus
Timken-Detroit Axle Co.,

Babbit Metal
Ajax Metal Co.
Johnson & Co., J. R.
More-Jones Brass & Metal Co.

Badges and Buttons
Elec. Service Supplies Co.
International Register Co.

Batteries, Dry
Nichols Lintern Co.

Bearings and Bearing Metals
Ajax Metal Co.
Bemis Car Truck Co.
Brill Co., The J. G.
General Electric Co.
More-Jones Brass & Metal Co.
Westinghouse E. & M. Co.

Bearings, Center and Roller Side
Stucki Co., A.

Bells & Buzzers
Consolidated Car Heating Co.

Bells and Gongs
Brill Co., The J. G.
Elec. Service Supplies Co.

Benders, Rail
Railway Trackwork Co.

Bodies, Bus
Cummings Car & Coach Co.
Graham Bros.

Body Material, Haskelite and Plymetl
Haskelite Mfg. Corp.

Boilers
Babcock & Wilcox Co.

Bolts & Nuts Track
Illinois Steel Co.

Bond Testers
American Steel & Wire Co.
Electric Service Supplies Co.

Bonding Apparatus
American Steel & Wire Co.
Electric Railway Improvement Co.
Elec. Service Supplies Co.
Ohio Brass Co.
Railway Trackwork Co.
Una Welding & Bonding Co.

Bonds, Rail
Amer. Steel & Wire Co.
Electric Railway Improvement Co.
Elec. Service Supplies Co.
General Electric Co.
Ohio Brass Co.
Railway Trackwork Co.
Una Welding & Bonding Co.
Westinghouse E. & M. Co.

Brackets and Cross Arms (See also Poles, Ties, Posts, Etc.)
Elec. Ry. Equipment Co.
Elec. Service Supplies Co.
Hubbard & Co.
Ohio Brass Co.

Brake Adjusters
Brill Co., The J. G.
National Ry. Appliance Co.
Westinghouse Tr. Br. Co.

Brake Shoes
Bemis Car Truck Co.
Brill Co., The J. G.

Brakes, Brake Systems and Brake Parts
Bemis Car Truck Co.
Brill Co., The J. G.
General Electric Co.
National Brake Co.
Westinghouse Tr. Br. Co.

Brushes, Carbon
General Electric Co.
Jeandron, W. J.
Le Carbone Co.
United States Graphite Co.
Westinghouse E. & M. Co.

Brushes Graphite
United States Graphite Co.

Bulkheads
Haskelite Mfg. Corp.

Bus Seats
Hale-Kilburn Co.

Buses, Motor
Brill Co., The J. G.
Cummings Car & Coach Co.
Graham Brothers
International Motor Co.
Mack Trucks, Inc.
Six Wheel Co., The

Bushings, Case Hardened and Manganese
Bemis Car Truck Co.
Brill Co., The J. G.

Cables, (See Wires and Cables)

Cambric Tapes, Yellow and Black Varnish
Irvington Varnish & Ins. Co.

Carbon Brushes (See Brushes, Carbon)

Car Lighting Fixtures
Elec. Service Supplies Co.

Car Panel Safety Switches
Consolidated Car Heat. Co.
Westinghouse E. & M. Co.

Car Wheels, Rolled Steel
Bethlehem Steel Co.

Cars, Dump
Brill Co., The, J. G.
Differential Steel Car Co.

Cars, Gas, Rail
Brill Co., The, J. G.

Cars, Passenger, Freight, Express, etc.
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Brill Co., The J. G.
Cummings Car & Coach Co.
Kuhlman Car Co., G. C.
National Ry. Appliance Co.
Wason Mfg. Co.

Cars, Second Hand
Electric Equipment Co.

Cars, Self-Propelled
Brill Co., The, J. G.
General Electric Co.

Castings, Brass Composition or Copper
Ajax Metal Co.
Anderson Mfg. Co., A. & J. M.
More-Jones Brass & Metal Co.

Castings, Gray Iron and Steel
American Steel Foundries
Bemis Car Truck Co.
Wm. Wharton, Jr. & Co.

Castings, Malleable and Brass
Bemis Car Truck Co.

Catchers and Retrievers, Trolley
Elec. Service Supplies Co.
Ohio Brass Co.
Wood Co., Chas. N.

Catenary Construction
Archbold-Brady Co.

Ceiling Car
Haskelite Mfg. Corp.
Pantasote Co., Inc.

Ceilings, Plywood, Panels
Haskelite Mfg. Corp.

Change Carriers
Cleveland Fare Box Co.
Electric Service Supplies Co.

Circuit-Breakers
Anderson Mfg. Co., A. & J. M.
General Electric Co.
Westinghouse E. & M. Co.

Clamps and Connectors for Wires and Cables
Elec. Ry. Equipment Co.
Elec. Ry. Improvement Co.
Elec. Service Supplies Co.
General Electric Co.
Hubbard & Co.
Ohio Brass Co.
Westinghouse E. & M. Co.

Cleaners and Scrapers Track (See also Snow-Plows, Sweepers and Brooms)
Brill Co., The J. G.
Ohio Brass Co.

Clusters and Sockets
General Electric Co.

Coil Banding and Winding Machines
Elec. Service Supplies Co.
Westinghouse E. & M. Co.

Coils, Armature and Field
General Electric Co.
Westinghouse E. & M. Co.

Coils, Choke and Kicking
Elec. Service Supplies Co.
General Electric Co.
Westinghouse E. & M. Co.

Coin Counting Machines
Cleveland Fare Box Co
International Register Co.

Coin Sorting Machines
Cleveland Fare Box Co.

Coin Wrappers
Cleveland Fare Box Co.

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Elec. Service Supplies Co.
General Electric Co.
Westinghouse E. & M. Co.
Wood Co., Chas. N.

Commutator Truing Devices
General Electric Co.

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General Electric Co.
Westinghouse E. & M. Co.

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General Electric Co.
Westinghouse Tr. Br. Co.

Condensers
General Electric Co.
Westinghouse E. & M. Co.

Condensor Papers
Irvington Varnish & Ins. Co.

Connectors, Solderless
Westinghouse E. & M. Co.

Connectors, Trailer Car
Consolidated Car Heat. Co.
Elec. Service Supplies Co.
Ohio Brass Co.

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Westinghouse E. & M. Co.

Controller Regulators
Elec. Service Supplies Co.

Controlling Systems
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Westinghouse E. & M. Co.

Converters, Rotary
General Electric Co.
Westinghouse E. & M. Co.

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Anaconda Copper Mining Co.

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American Brass Co.
American Steel & Wire Co.
Anaconda Copper Mining Co.

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Brill Co., The J. G.
Elec. Service Supplies Co.
International Register Co.
Roebling's Sons Co., John A.
Samson Cordage Works
Silver Lake Co.

Cord Connectors and Couplers
Elec. Service Supplies Co.
Samson Cordage Works
Wood Co., Chas. N.

Couplers, Car
American Steel Foundries
Brill Co., The J. G.
Ohio Brass Co.
Westinghouse Tr. Br. Co.

Cranes, Hoists & Lifts
Electric Service Supplies Co.

Cross Arms (See Brackets)

Crossing Foundations
International Steel Tie Co.

Crossings
Ramapo Ajax Corp.
Wm. Wharton, Jr. & Co.

Crossings, Frogs & Switches
Ramapo Ajax Corp.
Wm. Wharton, Jr. & Co.

Crossings, Manganese
Bethlehem Steel Co.
Ramapo Ajax Corp.
Wm. Wharton, Jr. & Co.

Crossings, Track (See Track Special Work)

Crossings, Trolley
Ohio Brass Co.
Westinghouse E. & M. Co.

Curtains & Curtain Fixtures
Brill Co., The J. G.
Morton Mfg. Co.
Pantasote Co., Inc.

Dealer's Machinery & Second Hand Equipment
Elec. Equipment Co.
Electric Traction and Bus Co.
Hyman Michaels Co.
Sachsenmaier Co., George
Salzberg Co., Inc., H. E.

Dealer Second Hand Rails
Electric Equipment Co.
Hyman Michaels Co.

Derailing Devices (See also Track Work)

Derailing Switches
Ramapo Ajax Corp.

Destination Signs
Elec. Service Supplies Co.

Detective Service
Wish-Service, P. Edward

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Brill Co., The J. G.
Consolidated Car Heating Co.
Nat'l Pneumatic Co., Inc.

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General Electric Co.
Hale-Kilburn Co.
Morton Mfg. Co.

Doors, Folding Vestibule
Nat'l Pneumatic Co., Inc.

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Electric Service Supplies Co.
Ohio Brass Co.

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Ohio Brass Co.
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National Railway Appliance Co.

Floodlights
Electric Service Supplies Co.

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Haskelite Mfg. Corp.

Floors
Haskelite Mfg. Corp.

Forgings
Brill Co., The, J. G.
Carnegie Steel Co.

Frogs & Crossings, Tee Rail
Bethlehem Steel Co.
Ramapo Ajax Corp.
Wm. Wharton, Jr. & Co.

Frogs, Track (See Track Work)

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Ohio Brass Co.
Westinghouse E. & M. Co.

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Wm. Wharton, Jr. & Co.,

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General Electric Co.

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Westinghouse Tr. Br. Co.

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Westinghouse E. & M. Co.

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Westinghouse E. & M. Co.

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Brill Co., The J. G.

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Ohio Brass Co.

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Brill Co., The, J. G.
Carnegie Steel Co.

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Westinghouse E. & M. Co.

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Gold Car Heat. & Ltg. Co.
Nat'l Ry. Appliance Co.
Smith Heater Co., Peter

Heaters, Car, Hot Air and Water
Smith Heater Co., Peter

Heaters, Car Stove
Smith Heater Co., Peter

Helmets, Welding
Railway Trackwork Co.
Una Welding & Bonding Co.

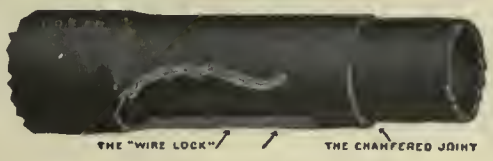
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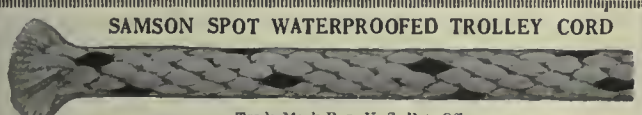
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Philip Carey Co., The

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Illinois Steel Co.
Rail Joint Co.

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Metal & Thermit Corp.

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Metal & Thermit Corp.
Railway Trackwork Co.
Una Welding & Bonding Co.

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Rails, Steel
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Carnegie Steel Co.
Illinois Steel Co.

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Carnegie Steel Co.

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Hale-Kilburn Co.

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Electric Equipment Co
Electric Traction & Bus Co.
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Sachsenmaier Co., George
Salzberg Co., Inc., H. E.

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Shovels
Brill Co., The J. G.
Hubbard & Co.

Shovels, Power
Brill Co., The J. G.

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Consolidated Car Heating Co.
Electric Service Supplies Co.
Nat'l Pneumatic Co., Inc.

Signals, Indicating
Nichols-Lintern Co.

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Electric Service Supplies Co.
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(Continued on Page 42)



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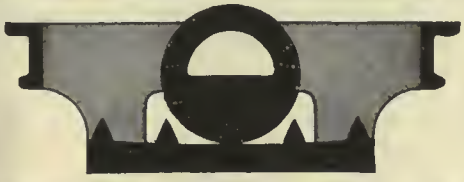
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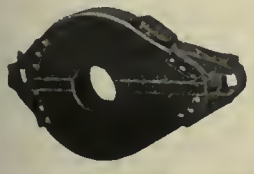
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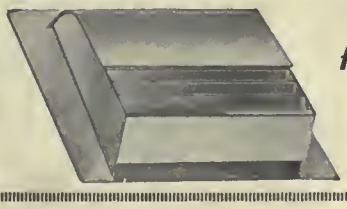
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ALPHABETICAL INDEX TO ADVERTISEMENTS

Page

A

Ajax Metal Co..... 33
Allison Co., J. E..... 21
American Appraisal Co., The... 22
American Asphalt Paint Co., The 30
American Brass Co., The..... 39
American Car Co.....28-29, 43
American Electrical Works.... 39
American Steel Foundries 4
American Steel & Wire Co..... 35
Anaconda Copper Mining Co... 39
Anderson Mfg. Co., A. & J. M.. 33
Archbold-Brady Co..... 20

B

Babcock & Wilcox Co..... 36
Beeler Organization 20
Bell Lumber Co..... 21
Bemis Car Truck Co..... 24
Bethlehem Steel Co..... 35
Bibbins, J. Rowland 21
Bridgeport Brass Co..... 15
Brill Co., The J. G.....28-29, 43
Buchanan & Layng Corp..... 20

C

Cameron Electrical Mfg. Co.... 21
Carey Company, The Philip, Front Cover
Carnegie Steel Co..... 35
Chillingworth Mfg. Co..... 41
Christensen Air Brake Co..... 8
Cleveland Fare Box Co..... 36
Collier, Inc., Barron G..... 30
Consolidated Car Fender Co.... 41
Consolidated Car Heating Co... 41
Cummings Car & Coach Co.... 27

D

Day & Zimmermann, Inc..... 20
Differential Steel Car Co., The.. 35
Dixon Crucible Co., Joseph..... 39

E

Electric Equipment Co..... 37
Electric Ry. Equipment Co..... 39
Electric Railway Improvement Co., The 21
Electric Service Supplies Co.... 9
Electric Traction & Bus Co.... 37

Page

F

Ford, Bacon & Davis..... 20
"For Sale" Ads..... 37

G

General Electric Co..18, Back Cover
Gold Car Heating & Ltg. Co.... 41
Graham Brothers 23
Griffin Wheel Co..... 34

H

Hale-Kilburn Co..... 12
Haskelite Mfg. Corp..... 32
"Help Wanted" Ads..... 37
Hemphill & Wells 20
Holst, Englehardt W..... 20
Hubbard & Co..... 34
Hyman-Michaels 37

I

Illinois Steel Co..... 26
International Motor Co.....10-11
International Oxygen Co..... 41
International Register Co..... 36
International Steel Tie Co., The. 7
Irvington Varnish & Insulator Co. 39

J

Jackson, Walter 20
Jeandron, W. J..... 34
Johnson & Co., Inc., J. R..... 41

K

Kelly, Cooke & Co..... 20
Kelker, DeLeuw & Co..... 20
Kuhlman Car Co.....28, 29, 43

Page

L

Leece-Neville Co., The..... 14
LeCarbone Co..... 34
Lorain Steel Co..... 35

M

Mack Trucks Inc.....10-11
McClellan & Junkersfield 20
Metal & Thermit Corp..... 41
More-Jones Brass and Metal Co. 34
Morton Mfg Co..... 41

N

Nachod and U. S. Signal Co.... 39
National Brake Co..... 19
National Pneumatic Co,. Inc... 13
National Ry. Appliance Co.... 35
Naugle Pole & Tie Co..... 21
Nichols-Lintern Co..... 41
Nuttall Co., R. D..... 31

O

Ohio Brass Co..... 5
Okonite-Callender Cable Company, Inc., The..... 39
Okonite Co., The..... 39

P

Pantasote Co., Inc..... 33
Perey Mfg. Co., Inc..... 41
Positions Wanted and Vacant.. 37

R

Rail Joint Co., The..... 35
Railway Track-work Co..... 34
Railway Utility Co..... 41

Page

Ramapo Ajax Corp..... 41
Richey, Albert S..... 20
Roebling's Sons Co., John A.. 21
Rooke Automatic Register Co.. 36

S

Sachsenmaier Co., George..... 37
Samson Cordage Works..... 39
Salzburg Co., Inc., H. E..... 37
Sanderson & Porter 20
Searchlight Section 37
Shuler Axle Co..... 21
Silver Lake Co..... 39
Six Wheel Co., The..... 25
Smith Heater Co., Peter..... 41
Star Brass Works..... 36
Stevens & Wood, Inc..... 20
Stone & Webster 20
Stucki Co., A..... 41

T

Timken-Detroit Axle Co..... 16
Tool Steel Gear & Pinion Co.. 32

U

Una Welding & Bonding Co.... 41
United States Graphite, The.... 31
United States Rubber Co..... 17
Universal Lubricating Co..... 36

W

"Want" Ads 37
Wason Mfg. Co.....28-29, 43
Westinghouse Elec. & Mfg. Co. 2
Westinghouse Traction Brake Co. 6
Wharton, Jr & Co., Inc., Wm.. 35
"What and Where to Buy" 38, 40, 42
White Eng. Corp., The J. G.... 20
Wish Service, The P. Edw.... 21
Wood Co., Chas. N..... 39

WHAT AND WHERE TO BUY

(Continued from Page 40)

Vestibule Linings
Haskelite Mfg. Corp.

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Morton Mfg. Co.

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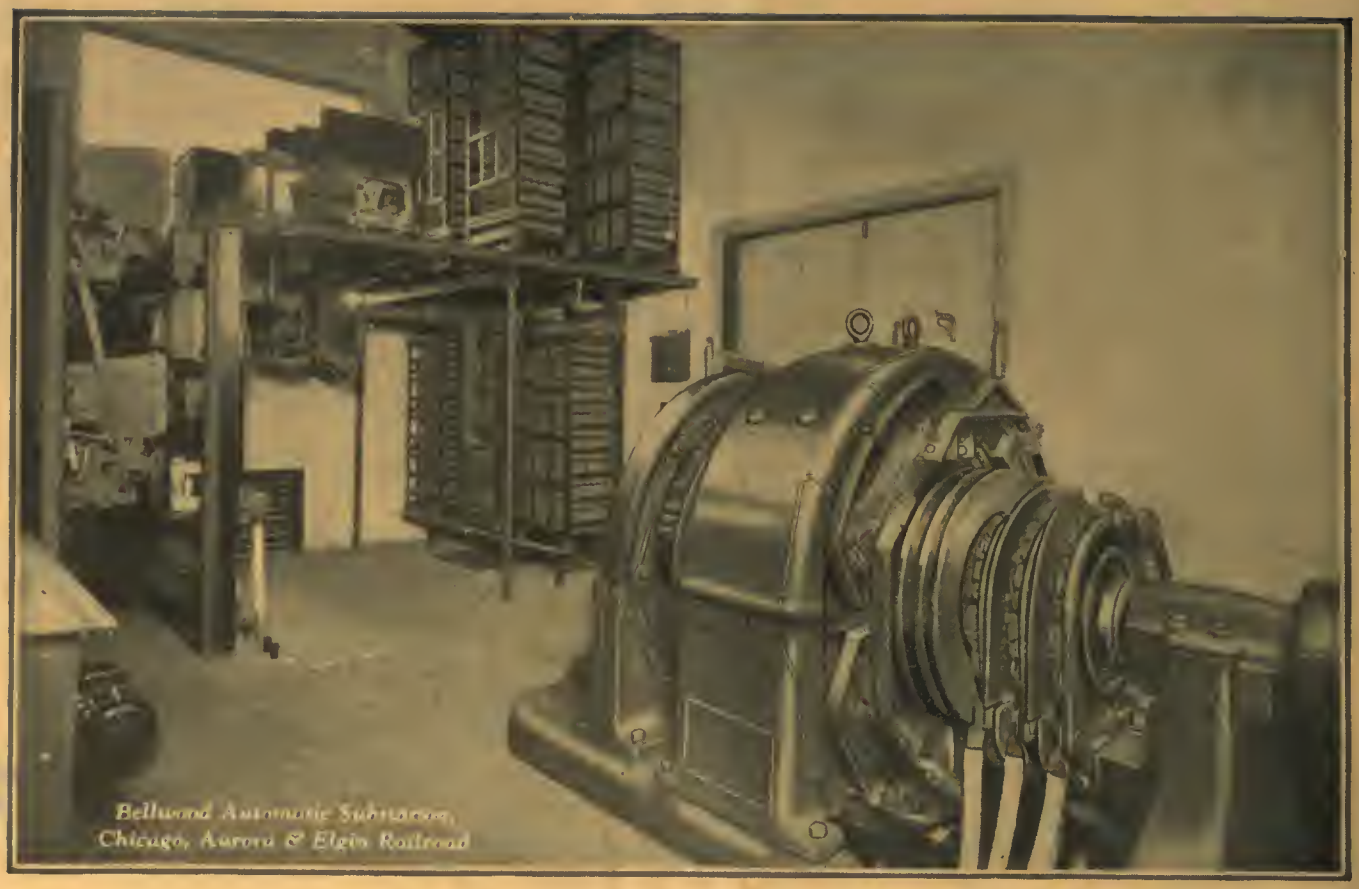


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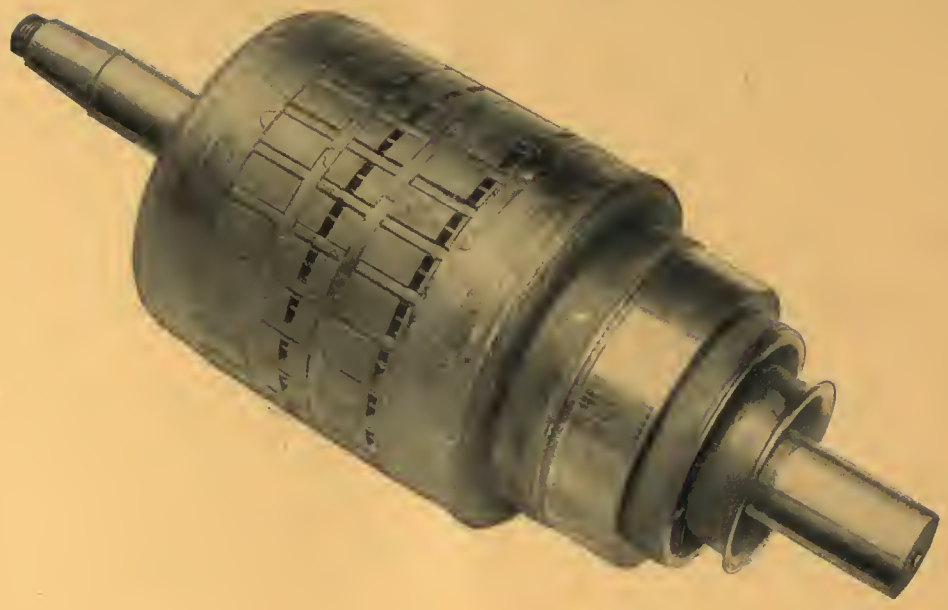
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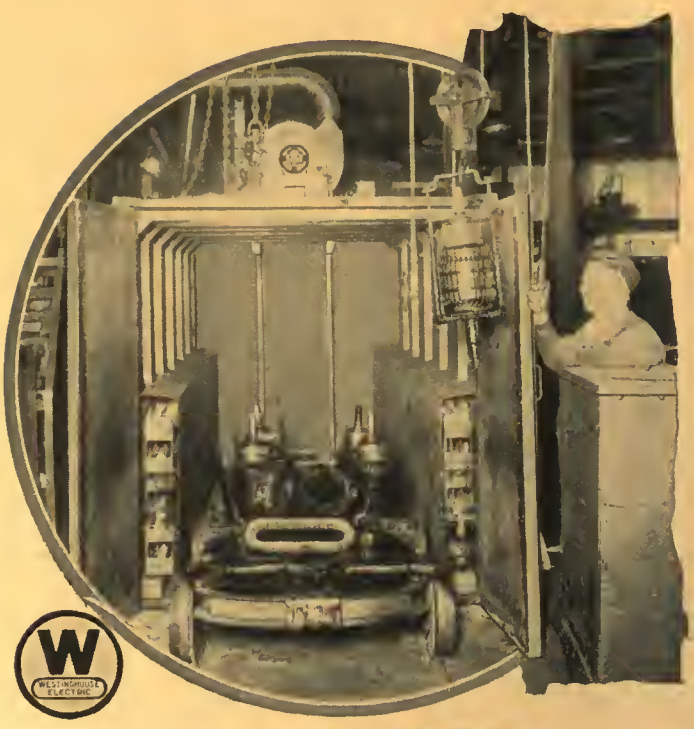
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Vol. 67
No. 22

Pages
911-952

CONTENTS

MAY 29, 1926

Editorials 911

New Cars for Grand Rapids Being Delivered 914

Effort to popularize street car service results in cars designed to compete with other forms of transportation in attractiveness, comfort and quietness of operation. Developed from three competitive designs submitted last spring.

Pittsburgh Boy Scouts Aid Traffic Survey 918

Some 400 sturdy boys volunteered and made a good job of checking vehicles downtown and at about fifty other important corners.

All Michigan Railway Employees Solicit Freight 918

P. R. T. Plans to Carry 62,000 an Hour at the Sesqui-Centennial 919

BY EDWIN F. THAYER.

Public transportation to the exposition grounds and inside will be cared for by the Philadelphia Rapid Transit Company. Information booths established throughout the grounds and in the city.

Better Car Routing and Traffic Control Proposed for Baltimore—II 923

Revision of car routing and traffic control methods are proposed by the engineers to reduce congestion in business district. A major traffic street plan is presented that is intended to relieve the present inadequate system of thoroughfares.

Trainmen Make Safety Suggestions 927

Platform men of Cleveland Railway appointed regularly as safety inspectors. Department of accident prevention formed. Co-operation with safety council results in well-attended mass meeting.

Texas Properties Are Getting Results from Good Merchandising Work—II 929

BY JOHN A. DEWHURST.

Subsidized bus service is Houston's answer to the problem of providing transportation service to newly-developed communities. San Antonio relies on its widely extended telephone dispatching service to perform a large part of its supervisory work. Coffin prize contest attracting attention.

Railway Doing Well in Augusta 932

One-man cars used exclusively on city lines. Improved rolling stock has brought lower costs. No increase in competition from private automobiles expected.

The Readers' Forum 933

Maintenance Notes 934

Temporary Lighting Stands 934
Pneumatic Tires on Acetylene Welding Truck 934
Armature Failures Eliminated by Baking 934
Turntable Speeds Sash Painting 935
New Equipment Available 935
Improved High-Speed Circuit Breaker 935
Tilting Frame for Motor-Driven Saw 936

Association News and Discussions 937

News of the Industry 938

Recent Bus Developments 946

Financial and Corporate 948

Personal Mention 951

Manufactures and the Markets 952

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Power
Chemical and Metallurgical Engineering
Coal Age
Engineering and Mining Journal-Press
Ingeniería Internacional
Bus Transportation
Electric Railway Journal
Electrical World
Industrial Engineer
Electrical Merchandising
Radio Retailing
Successful Methods
Journal of Electricity
(Published in San Francisco)
American Machinist—European Edition
(Published in London)

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Peak Hour Economy

During peak hours, effective operation of ordinary brake equipment on modern light weight cars is diminished with the loading of commuting crowds—just when adherence to schedules is of the utmost importance. This condition is remedied by the

WESTINGHOUSE VARIABLE LOAD BRAKE!

During peak hours, schedules must be fast and consistent, especially through congested districts, to command passenger good will and patronage. This means that maximum speed must be maintained longer between stops than is possible without the

WESTINGHOUSE VARIABLE LOAD BRAKE!

During peak hours, every traction company counts its minutes saved collectively in terms of dollars. You can Save Money At Every Stop and get the utmost out of your rolling stock by using the

WESTINGHOUSE VARIABLE LOAD BRAKE!

Westinghouse Traction Brake Company

General Office and Works: Wilmerding, Pa.

WESTINGHOUSE TRACTION BRAKES

SAVING THE RAIL SAVES THE RAILWAY

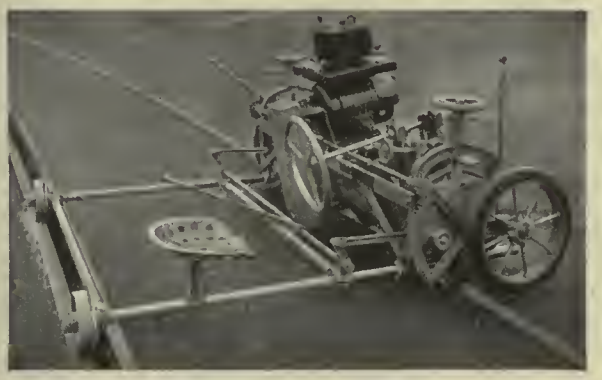
Never a truer word:

"It is due entirely to the fact that most companies have allowed their standards of maintenance to fall to low levels that cars go rattling along on poorly maintained tracks. It is up to those interested each year to spend more effort and money on bettering the conditions of cars and tracks. These results will soon repay all moneys wisely spent."

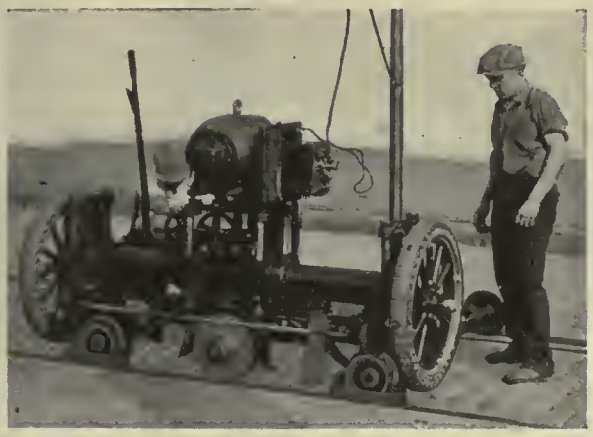
Thus wrote Mr. A. T. Clark, Supt. Rolling Stock and Shops, United Railways & Electric Company of Baltimore.

No word that we could add would further emphasize the need for efficient track maintenance equipment.

We offer it.



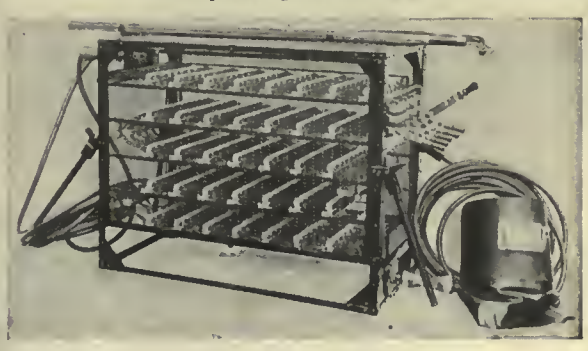
"Improved Atlas" Rail Grinder



"Imperial" Track Grinder



Reciprocating Track Grinder



"Ajax" Electric Arc Welder

Railway Track-work Co.

3132-48 East Thompson Street, Philadelphia

AGENTS:

Chester F. Gailor, 30 Church St., New York
Chas. N. Wood Co., Boston
Electrical Engineering & Mfg. Co., Pittsburgh
H. F. McDermott, 208 S. La Salle St, Chicago
P. W. Wood Railway Supply Co., New Orleans, La.
Equipment & Engineering Co., London
Frazar & Co., Japan.

1041

SAVING THE RAIL SAVES THE RAILWAY



International Creosoted Pine Poles in Signal Service on the Big Four.

Great Permanent Strength

—is the outstanding feature of Creosoted Yellow Pine Poles. It insures long life, low annual cost, trouble-free operation and negligible maintenance and replacements.

Specifying ***International*** Poles gives assurance of quality—sound timber and scientific treatment under rigid chemical control.

International poles, time tested by more than 25 years of service are in use from coast to coast.

International Creosoting & Construction Co.
General Offices—Galveston, Texas

International
Creosoted Yellow Pine Poles



Simple and Economical Paved Track Construction

NOTICE the simplicity of a Twin Tie installation illustrated by this picture taken on Broadway, the Main Street of Mattoon, Illinois—

Five men and a Foreman
A concrete mixer
A hose, tamping bars, shovels, etc.

With Twin Ties there is no gauging required—aligning and surfacing is simplified. The rail fastenings are put on with a sledge by any type of labor

The initial and ultimate cost of permanent steel tie construction is as much as $5,000.00 a mile less than wood ties.

What Shall We Send You?

Catalogue,
Quotations,
Proposal Drawing,
Estimate, 1925 Detail Costs.

The International Steel Tie Co.
Cleveland, Ohio

Steel Twin Tie Track

Renewable Track · · Permanent Foundation

Noise reduction



H. S. Williams, *Assistant Superintendent of Equipment of the Department of Street Railways, City of Detroit. Mr. Williams is an authority on problems related to noise reduction, and is Chairman of the Noise Reduction Committee of the American Electric Railway Engineering Association.*

now being given serious consideration

"SOMETHING must be done to dampen the vibrations set up in the track rails if we are to go the limit in our efforts to reduce the noise in car operation."

That is the opinion recently expressed by H. S. Williams of the Detroit Street Railways. And as he is Chairman of the Noise Reduction Committee of the American Electric Railway Engineering Association, Mr. Williams speaks with the voice of authority.

Elaborating on his point of view, Mr. Williams continued, "This problem did not exist in old-time construction on wood ties. But modern rigid construction possesses such characteristics as to make it exceedingly noisy when cars pass over it.

"As this type of construction is required for economic reasons, it becomes necessary to modify it to such an extent that it shall not be objectionably noisy. Otherwise, there will be such a racket within the cars as to drive away passengers, and also to cause serious protest from residents of adjacent property."

The marked reduction in noise is always commented on following the installation of Carey Elastite System of Track Insulation.

The Carey System also lessens pavement failure in the track zone because it keeps out water and frost, and takes up expansion stresses. Engineers are finding, too, that it greatly prolongs the life of track and pavement.

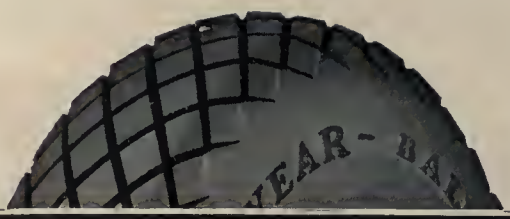
Write for complete information.

The Carey Elastite System of Track Insulation consists of a preformed asphaltic compound which forms a resilient cushion between the rail and the pavement. Made to fit any rail section. A tap with a mallet sets the strips in place. Entirely unaffected by moisture or changes in temperature.

THE PHILIP CAREY COMPANY
Lockland, Cincinnati, Ohio

Carey Elastite
REG. U.S. PAT. OFF.
TRADE MARK REG'D. U.S. PATENT OFFICE

SYSTEM OF
TRACK INSULATION



Goodyear Balloon Tires for Motorbuses



Goodyear Balloon Bus Tire
Made with Supertwist

The nine successful and well-known operators listed in the panel below are among the bus owners now using Goodyear Balloon Tires.

Their common experience is that these tires not only provide the last word in smooth and easy riding qualities, but also result in very definite economies.

They save money on upkeep and breakage, effecting material reductions especially in spring breakage.

They develop maximum tractive power in any going, steer easily, and yield unusually long, trouble-free mileage at low tire cost per mile.

Goodyear Balloon Tires for Motorbuses are the final development of Goodyear Pneumatic Bus Tires. Their rugged, active cushioning qualities represent the peak of that development which has accompanied every progressive move of motor-bus transportation.

Made with SUPERTWIST, the extra-durable, extra-elastic fabric which Goodyear developed especially for the low-pressure tire, Goodyear Balloon Tires demonstrate in motor-bus service the superior stamina and finer riding qualities which SUPERTWIST alone provides.

If you want to give your patrons not only a very convenient and economical service, but one that also is superlative from every standpoint of luxurious comfort, equip with Goodyear Balloon Bus Tires made with SUPERTWIST. They are better balloons, yet they cost you no more.

LARGE OPERATORS USING
GOODYEAR BALLOON BUS TIRES

Boston Elevated Ry.	Boston, Mass.
Capitol Traction Co.	Washington, D. C.
Colonial Motor Coach	Watertown, N. Y.
Detroit Motorbus Co.	Detroit, Mich.
Kansas City Railway Co.	Kansas City, Mo.
Motor Transit Co.	Los Angeles, Calif.
Northern Ohio Power & Light Co.	Akron, Ohio
Northland Transportation Co.	Minneapolis, Minn.
T. M. E. R. & L. Co.	Milwaukee, Wis.

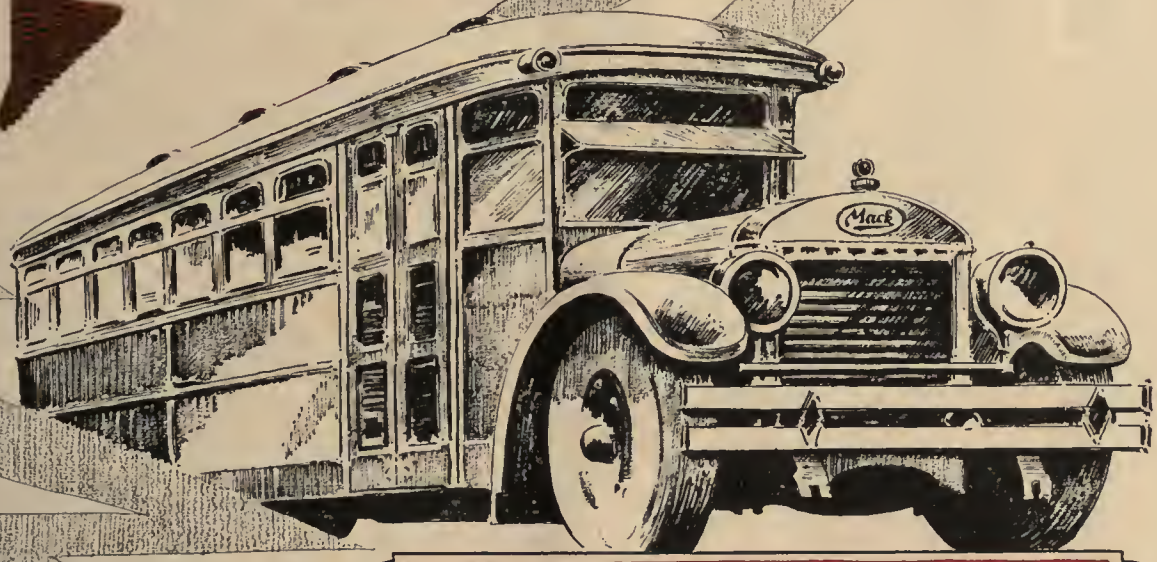
For every Goodyear Cord Bus Tire there is an equally fine Goodyear Tube, built especially to the needs of bus service

GOODYEAR

Copyright 1926, by The Goodyear Tire & Rubber Co., Inc.

Mack

GAS-ELECTRIC



Engineering Leadership again evident in the Mack Gas-Electric One-Motor Bus





Again *Mack* steps to the fore with

Always progressive, Mack steps to the fore with a Gas-Electric One-Motor-Bus which answers the question, *"Which is the right drive, one or two motors?"*

Mack uses one motor because one motor does the job with less weight and with less units to take care of, thus eliminating extra maintenance and costs. At the same time Mack retains the standard Mack rear axle, single propeller shaft and the many other exclusive features which have identified Mack with successful *performance*. You get a bus that is completely Mack design throughout, plus perfected gas-electric features that mean greater economy.

For instance, only Mack can take up the inertia of the generator and armature as Mack does it, for only Mack uses a Rubber Torsion insulator, developed after long experience with Rubber Shock Insulators—another Mack exclusive feature.

And Mack careful engineering provides for the installation of the motor entirely below the flooring. No special housing protrudes above the floor and encroaches upon valuable space. Due to the chassis construction and mountings of the motor none of the ground clearance of the bus is lost. In the



TRIC

–one motor drive



THE RIGHT DRIVE– ONE MOTOR

Mack Gas-Electric the clearance is 9½ inches, identical with that in the standard bus. Operating experience has demonstrated that in hard going through mounds of slush the Mack high clearance kept the motors out of the wet and in commission when other transportation units failed to maintain schedules—a performance typical of Mack.

If you value simplicity, quick acceleration, smoothness and ease of operation incorporated in a design that assures the greatest economy in cost of maintenance you will find the answer in the Mack Gas-Electric One-Motor-Bus—perfected by Mack engineers under actual operating conditions and released only after positive knowledge that Mack's reputation for performance will not only be supported, but strengthened.

The creation and maintenance of car advertising space values requires the same degree of highly specialized knowledge as the construction and maintenance of railroads. Such tasks should be delegated only to those of widest experience and longest record of success.



Barron G. Collier
INCORPORATED
CANDLER BLDG. NEW YORK

Look good for another 10,000 after running almost 50,000 miles

Acme Coach Line
Cadillac, Michigan
Feb. 15th, 1926.

Kelly-Springfield Tire Co.,
5900 Cass Ave.,
Detroit, Mich.

Gentlemen:-

Our Acme Bus has been driven 48,995 miles over heavy, rough gravel roads M-13 from Traverse City to Howard City and the two 34x7 Kelly-Springfield tires in front have gone the entire distance, one has never had the air out of it.

These tires look like they are good for 10,000 miles more and I wish to congratulate your Company on building such a wonderful tire which can stand such hard road usage. Our average road speed is about 26 miles per hour.

Enclosed find picture, in which you will notice the excellent condition these tires are still in. We have Kelly-Springfields 36x8 in the rear and they have proven very satisfactory.

Very truly youre,
ACME COACH LINE
L. B. Donnally Propr.

D-J

THE experience of bus operators with Kelly Heavy-Duty Cords tells the story of greater mileage and lowered operating costs better and more convincingly than anything we ourselves might write. Kellys give good service to large and small operators alike, and increase their profits by cutting costs.

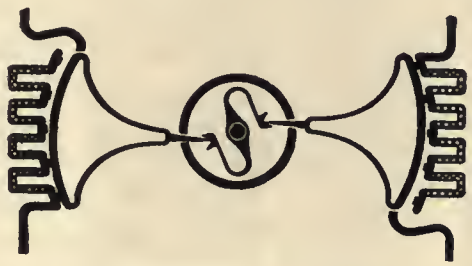
Kelly-Springfield Tire Co.
250 West 57th Street, New York, N. Y.



KELLY HEAVY DUTY CORD

IN THE POWER STATION

American Brown Boveri Power Regulator



FULL automatic regulation as secured by Brown Boveri regulators means complete proportioned equalization of currents in all machines in parallel without any attention on the part of the operator. It means the machine is started, synchronized, and fully loaded on regulation. It means the quiet and stable regulation of machines having entirely different characteristics giving each one its most economic point of saturation. It means cross currents kept to a minimum.

A total of 20,000 machines are now operating under these advantages. These devices will provide for the maintenance of constant voltage current, speed, power or power-factor.

The outline diagram at the top of this page is the symbol of Brown Boveri regulation and includes these three closely related instruments:

Automatic Quick-acting Voltage Regulator.
Automatic Current-limiting Regulator.
Automatic Synchronizer.

ABB

PRINCIPAL PRODUCTS OF AMERICAN BROWN BOVERI ELECTRIC CORPORATION

Electric Locomotives
for any system of current, high or low, tensions
Complete Equipment
for railway electrification
Mercury-Arc Power Rectifiers
(steel enclosed)
Diesel-Electric Locomotives
Mining Locomotives
Motors (all sizes and types)
Rotary Converters
Motor Generators
Transformers (power or current)
Switches, Controllers
and all Auxiliary Equipment
Oil Switches
Condensers and Auxiliaries
Steam Turbo Generators
for normal or high pressures and superheats
Automatic Regulators
Relays
Turbo Compressors and Blowers
Electric Furnaces
Induction Regulators
Ships
Diesel Driven
Turbine Driven
Electrically Driven
Structural Steel Fabrication

IN THE SUB STATION

American Brown Boveri Steel Enclosed Rectifier



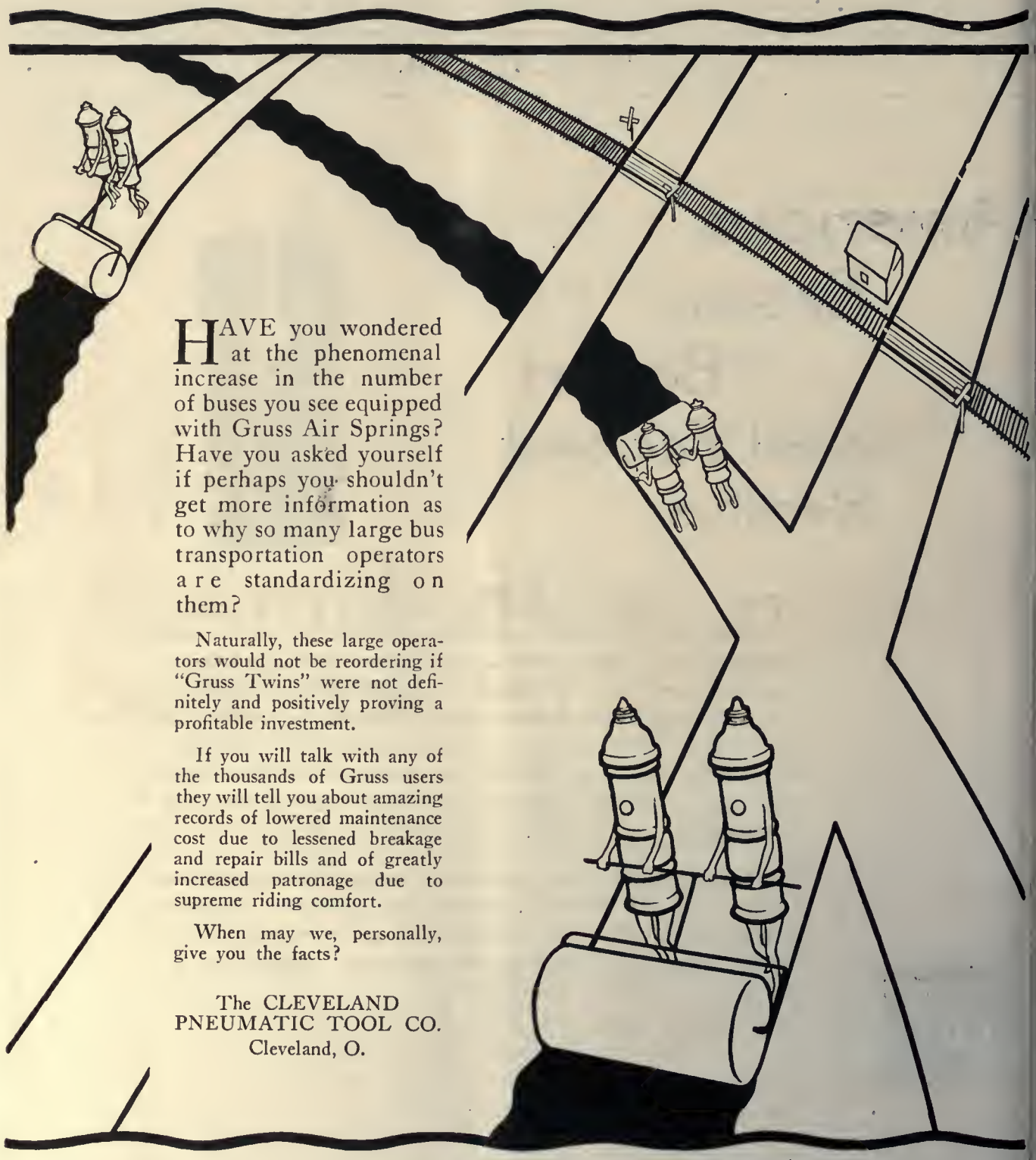
THE meaning of the word "Power" in the term—Mercury-Arc Power Rectifier refers to large steel enclosed units that perform the same service as rotary converters or motor-generators not only more efficiently, but with several other advantages. While the basic principle is identical with the familiar mercury-arc glass enclosed rectifier for house lighting voltages, the high duty (reaching 3000 KW.), which it performs requires entirely different construction and operating details.

Advantages include high efficiency over wide load-variation, absence of the inherent drawbacks of heavy rotating parts, absence of need for synchronizing, very little attendance, absence of hum and vibration and adaptability to automatic control.

ABB

AMERICAN
BROWN BOVERI
Electric Corporation

Plants: Camden, N. J. Main Office: 165 Broadway, New York



HAVE you wondered at the phenomenal increase in the number of buses you see equipped with Gruss Air Springs? Have you asked yourself if perhaps you shouldn't get more information as to why so many large bus transportation operators are standardizing on them?

Naturally, these large operators would not be reordering if "Gruss Twins" were not definitely and positively proving a profitable investment.

If you will talk with any of the thousands of Gruss users they will tell you about amazing records of lowered maintenance cost due to lessened breakage and repair bills and of greatly increased patronage due to supreme riding comfort.

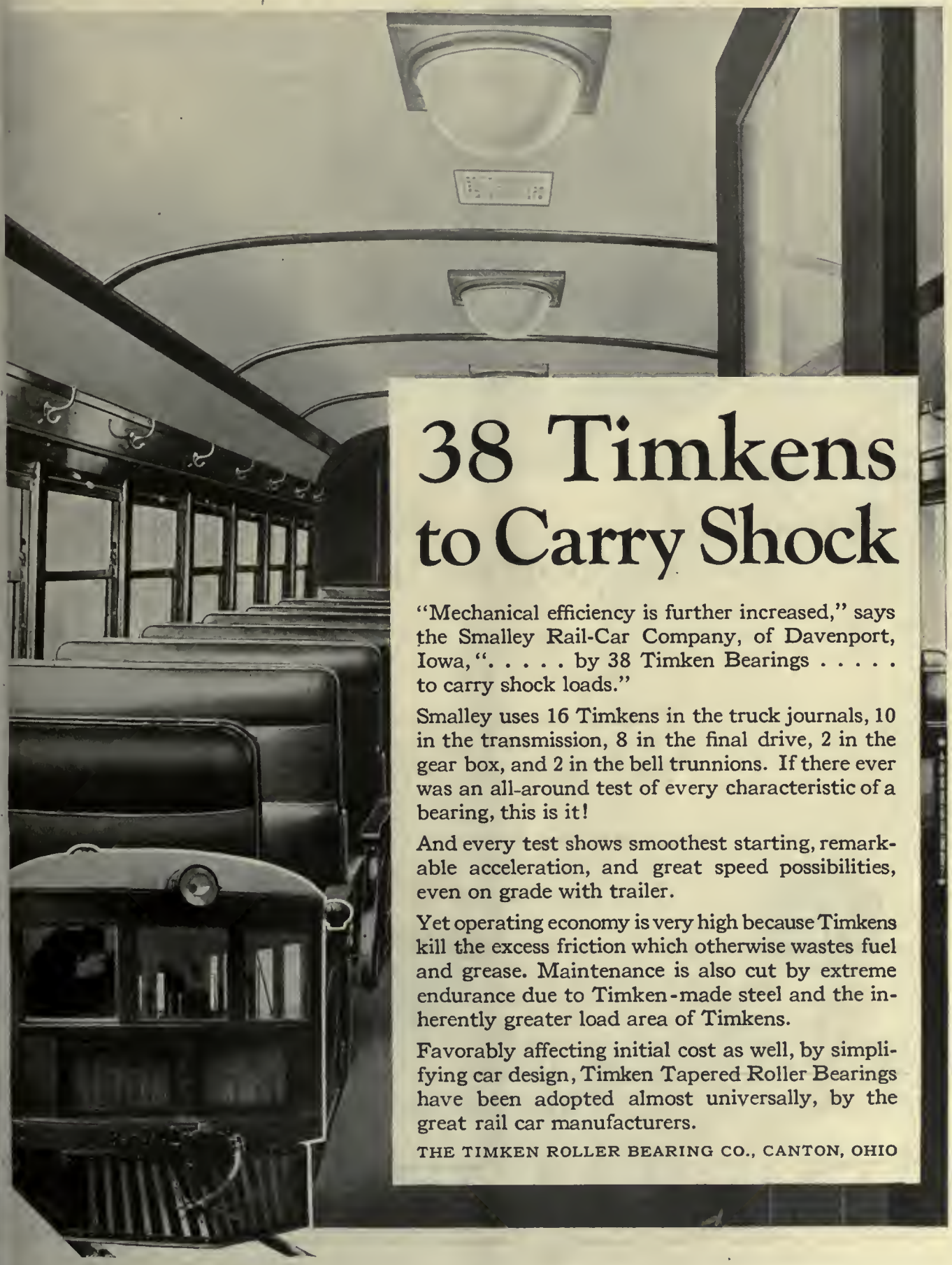
When may we, personally, give you the facts?

The CLEVELAND
PNEUMATIC TOOL CO.
Cleveland, O.

GRUSS AIR SPRINGS

for Trucks, Buses
Passenger Cars ~

TIMKEN *Tapered Roller* BEARINGS



38 Timkens to Carry Shock

"Mechanical efficiency is further increased," says the Smalley Rail-Car Company, of Davenport, Iowa, ". . . . . by 38 Timken Bearings . . . . . to carry shock loads."

Smalley uses 16 Timkens in the truck journals, 10 in the transmission, 8 in the final drive, 2 in the gear box, and 2 in the bell trunnions. If there ever was an all-around test of every characteristic of a bearing, this is it!

And every test shows smoothest starting, remarkable acceleration, and great speed possibilities, even on grade with trailer.

Yet operating economy is very high because Timkens kill the excess friction which otherwise wastes fuel and grease. Maintenance is also cut by extreme endurance due to Timken-made steel and the inherently greater load area of Timkens.

Favorably affecting initial cost as well, by simplifying car design, Timken Tapered Roller Bearings have been adopted almost universally, by the great rail car manufacturers.

THE TIMKEN ROLLER BEARING CO., CANTON, OHIO



A good Rewind —as good as the original job

Ready-cut insulations and properly fitting armature coils are essential if you wish to make rewound armatures as good as new.

These insulations are supplied in convenient packages, one set to a package. Each set contains not only just enough material, but all cut for your winder so he need waste no material —nor spend time in cutting and fitting.

Most important of all is the *original equipment quality* of standard packaged insulations, ready-cut for G-E Motors. These can be supplied only by General Electric.

Nothing has added so much to the quality, and to the economy, of armature rewinding in recent years as G-E Ready-cut Insulations. It will pay you to standardize on their use and stock them as you do armature coils.



For Original Equipment Quality

54C-34

GENERAL ELECTRIC

Electric Railway Journal

Consolidation of Street Railway Journal and Electric Railway Review

Published by McGraw-Hill Publishing Company, Inc.

CHARLES GORDON, *Editor*

Volume 67 New York, Saturday, May 29, 1926 *Number* 22

Car Design Gets a Forward Impetus

PRINCIPAL features of the new cars developed by Grand Rapids are presented elsewhere in this issue. These are the outgrowth of the ideas incorporated in three sample cars submitted by competitive builders last spring. The cars which are being delivered include what were considered the best elements of the sample cars.

In this effort to stimulate the improvement of cars, Grand Rapids has rendered a notable service to the industry. Mr. DeLamarter believes that street cars can be made attractive to passengers and a credit to the city in which they are operated. There is unmistakable evidence in these latest cars of the possibilities in this direction.

Neither Mr. DeLamarter nor the JOURNAL believes that they represent the ultimate in design. Development of the automobile did not take place in a single model or in the mind of any one individual. It has been the result of collective thinking and collective experience. Primary significance attaches to the Grand Rapids cars not as an ultimate design but as a definite step beyond the bounds of precedent. If the net result is merely to stimulate a more general effort to improve the street car as a transportation merchandising agency Mr. DeLamarter's strenuous efforts in the face of many obstacles and some skepticism will prove of invaluable service to the industry.

British Transport Workers Find They Are Not Indispensable

DOGGED determination to see it through at whatever cost of personal comfort and convenience enabled the British public to win a real victory in the recent general strike. Rudyard Kipling, who has put the psychology of his fellow countrymen into words as few other writers ever have done, tells:

> How in all time of our distress
> And our deliverance too,
> The game is more than the player of the game
> And the ship is more than the crew.

Although written years ago, these lines epitomize exactly the spirit that broke the general strike. It was the realization that "the ship is more than the crew" that impelled Tom, Dick and Harry to keep the wheels turning when the regular workers quit.

At this distance, it is impossible to evaluate accurately the merits of the controversy between the British coal miners and the mine owners; nevertheless, it is sufficiently clear that the attempt to paralyze the life of the nation by calling a general strike, including public service employees, was not the way to settle the coal question. Grave fears were entertained in many well-informed quarters, however, that this effort might succeed to the point of forcing some concession from the government. But the trades union officials apparently misjudged the temper of the British public. The ordinary, easy-going citizen got mad and upset the plans of the labor leaders.

Volunteer workers were instrumental in restoring the transportation services promptly, as told in a news article from the London correspondent of ELECTRIC RAILWAY JOURNAL, and published elsewhere in this issue. While these volunteers undertook to operate to some extent the tramways rapid transit lines, and steam railroads, it was in the field of bus operation that they were most successful. A large part of the London traffic normally is carried by bus, and it was found possible by the combined efforts of the independents and experienced automobile drivers hastily converted into bus drivers, to provide a surprisingly effective transportation service. Private motor cars also carried many thousands of people. Conditions generally similar to those in London prevailed also in the smaller cities.

Thus the British transport workers discovered that they were not indispensable. The public, greatly irritated by the attitude of the unions, determined to break the general strike and found they could do it. The experiment and its outcome taught a lesson that will long be remembered.

Failure of Interstate Bus Lines Points to Need of Regulation

LACK of interstate bus regulation has encouraged operators in many instances to undertake a type of service which the bus is not fitted to perform. Recent developments in the field of New York-New Jersey operation furnish convincing evidence of this. Traffic checks show only 24 lines now in operation, carrying some 6,000 passengers a day, as compared with 30 lines carrying about 9,000 daily passengers a month ago. Altogether nearly half the routes that were in operation at one time or another have been discontinued.

Suspension of service on these bus lines is due to their failure to attract as much patronage as was expected. The total volume of interstate traffic in this territory is enough to support many times the number of buses which have been engaged in such operation. The bus service, however, has been not only less regular than the rail service but also considerably more expensive. The slow crossing of the Hudson River on ferryboats crowded with other vehicles has been a serious obstacle to successful operation. Traffic congestion in New York City has been another difficulty.

On account of these conditions only a small part of the rail traffic has been taken away—not enough to support the hundreds of buses which rushed into the business. The weaker operators have been forced to the wall, and in a number of instances the dealers have replevined the buses for failure to make purchase payments. Many operators still continue, and in some

cases probably are filling a real transportation need. By providing through service without change of vehicle from certain suburban communities to the shopping district of New York City the buses supply a type of transportation which the rail carriers cannot offer. The extent of the demand for such service at the price which must be charged for it is problematical. Judging by the present trend of events it appears that the peak of this kind of operation has passed.

However, it would be a grave mistake to assume that because there has been some improvement in this particular situation the whole problem will work itself out satisfactorily without official regulation. In the North Jersey area the rail carriers are in a strong position and have not been seriously affected by the competition. This is not true in every locality where interstate bus operation has been undertaken, and protection of the rail carriers is undoubtedly necessary in many cases. Moreover, needless duplication of facilities is bound eventually to increase the price of transportation and proper regulation is needed to protect the interest of the public in this regard. Responsible bus operators themselves would profit from regulation, which would prevent overcrowding of those routes where an opportunity exists to furnish service that is really needed. From every point of view the sooner that proper regulation is secured the better it will be for everybody.

Amateur Engineering Is Dangerous as a Basis for Spending $4,000,000

CALLING the report of Seattle's Rapid Transit Committee a layman's report is perhaps the kindest thing that can be said. It is a noble effort but fraught with the pitfalls that lie in the wake of such attempts on the part of the uninitiated in technical matters. The "findings and recommendations" included in this report to the City Planning Commission are abstracted elsewhere in this issue.

Seattle has had a hard time with its transportation. Its surface lines were dragged down for years by political barterers while under Stone & Webster management, and now as a municipal proposition it has been almost sunk to oblivion. Costs have mounted under city management and revenues have steadily decreased. Now a new idea develops. Because the municipal operation has failed, as is maintained in the report, the committee finds that a combination subway-elevated system of rapid transit is necessary.

No brief is held by this paper for or against the necessity of such a system, but the methods of arriving at the conclusion in the report in favor of it, founded on the variegated and somewhat heterogeneous nature of the material, would lead one to doubt the value of the findings, whether they were for or against the object of the investigation. Certainly the finding by the committee that a rapid transit scheme was desirable because of the advertising value to the city will make cold beads of perspiration stand out on the brows of those who have lived through the early financing of some existing operations.

The industry has trouble enough to solve the problems confronting it, even with the use of the best talent available, without being embarrassed with projects that liken themselves to the old stanza, "I shot an arrow in the air, it fell to earth I know not where." The report is colored with quotations from men well known in the industry, such as Frank Sprague, Roger W. Babson, John Beeler and Edward W. Bemis. None of these men has reported on the Seattle situation, but the quotations and comparisons are drawn from public reports or testimony given in connection with investigations in other cities or from correspondence. Such scattered statements are interpreted in the report to have a bearing on the Seattle situation.

Probably the committee was vested with the authority to make a report without being allowed an appropriation for the work involved. If this be the case, more respect would have been forthcoming if the committee had recommended that an engineering investigation be made rather than produce the superficial report that, wrongly used, may cause incalculable harm.

Neither Seattle nor the industry can afford amateur play with its transportation.

Present Expediency May Endanger the Future

NEWS of the consummation by the Fifth Avenue Coach Company of an agreement to buy the New York Railways as a step in bringing about the establishment of a comprehensive bus system in Manhattan has again aroused general interest in the popular subject of bus versus street car in that city.

There are some phases of this latest move that may well be given attention by local transportation men in other cities, in order that the facts and the conditions surrounding the New York developments may be properly interpreted and in order that the wholesale drawing of general conclusions from a most specialized set of premises may be avoided.

It may be well to reiterate here that ELECTRIC RAILWAY JOURNAL is a hearty advocate of the bus as a valuable transportation tool. It is interested primarily in the development of the local transportation industry and has no fetish of sentiment or precedent in favor of any one vehicle over another. It believes that the bus makes possible a broader field for common carrier passenger business instead of foreshadowing the passing of the street car as a mass transportation agency; that the successful exploitation of this broadened field depends on the establishment with the bus of a higher grade form of common carrier transportation at proportionately higher rates of fare.

One outstanding fact characterizes all of the various proposals to substitute buses for cars in New York. There is in the whole situation a primary motive of expediency. Some of the trolley lines which it has been proposed to remove have proved unprofitable. Others have been more or less profitable. But the significant fact is that these results have been obtained under conditions peculiar to operation in New York. These have been both political and physical. Under the former classification falls the 5-cent fare; under the latter is the expensive conduit slot contact system which the railways in Manhattan are required to use. There is also no apparent effort in New York through traffic regulations to expedite movement of street cars.

In the sense that the proposal to substitute buses for certain rail lines offers a means of surmounting these obstacles which have retarded transportation improvement in Manhattan for years, the proposal may prove to be a wise one. But in the sense that it makes of the bus a mass transportation vehicle rather than a preferred service vehicle it is open to question. Worthy of note in this connection is the fact that there is no intimation in any of the various proposals which

have been made of any inclination by the Fifth Avenue Coach Company to modify in any respect the conditions or character of service which it now renders. Its present operations are not pooled in a city-wide system with the lines it proposes to establish.

At present the Fifth Avenue system offers "a seat per passenger service" at a flat 10-cent fare. But there is some basis for considering that such service has been made possible only by virtue of the existence of other mass transportation agencies to take the overflow of those who cannot obtain a seat, and which give service of a grade lower than a seat per passenger standard at half the bus fare. Wholesale substitution of buses for cars involves use of the bus for this base service which by its existence makes possible maintenance of the present high standard on Fifth Avenue. Installation of buses as merely street cars on rubber tires tends to load on their operation the public and political pressure for minimum fare and, by leading the public to consider buses as mass transportation vehicles, sets up in the public mind a standard of bus service that may prove a serious obstacle to the establishment of preferred forms of service at relatively high rates of fare. Since it is in this latter field that the bus appears to offer greatest prospect of development, the temptation for enthusiasts to aspire to street car replacement with buses seems an opportunist policy that may prove expensive to both the public and future bus operator.

Building Traffic Plans Around Mass Transportation

PLANNING street car and bus lines without paying attention to vehicle traffic in general is futile. The growth in number of trucks and automobiles in the past few years has been so great that it is almost beyond comprehension. As an example, in Baltimore the number of automobiles registered increased from 44,500 in 1922 to 81,400 in 1925, as shown by figures in the report of the engineers to the Traffic Survey Commission. Use of these vehicles in the same period is indicated by cordon counts taken around the business district. These show 117,000 vehicle movements in 1922 and 176,000 in 1925. If roadway space permits, the number of vehicle movements will be 308,000 in 1930 and 386,000 in 1940, the engineers estimate.

Here is a problem that transcends almost everything else concerned with the movement of public vehicles. Unless steps to provide for the situation are taken at once, a crisis will arise in the not very distant future that will paralyze all existing forms of transport. And similar congestion is the rule rather than the exception in American cities, large or small.

Vehicle traffic cannot be legislated off the streets. It has become part and parcel of our civic development. So it is necessary to make provision for accommodating it in such manner that it will interfere with public transportation agencies as little as possible. One way of doing this, as proposed in the Baltimore report, is the creation of a system of major traffic streets so located as to reduce to a minimum needless movements through the business district.

But whatever the solution, the railway man should be in the van when it is being worked out. It is to the advantage of the city to have mass transportation provided first of all, and individual transportation built around it. For only in this way will the best interests of business and industry be served.

Humanizing Modern Industry

SOME men there are whose prominence in the industrial world lends a deep significance to their every utterance. But Owen D. Young, chairman of the board of the General Electric Company, is a national and international figure whose service to modern society has surpassed the limits of mere industrialism. Consequently his recent advocacy of a "cultural wage" before the National Industrial Conference Board at its tenth anniversary meeting in the Hotel Astor, New York, on May 20, may be a powerful influence in broadening the industrial conception of social economics.

Mr. Young defined the cultural wage as one that would enable the individual to develop his intellect and profit through the opportunities afforded by the resources and wealth of the country. The payment of this wage, he said, will not make industry less profitable. On the contrary, he believes that the assumption by industry of a leading rôle in the development of the social, as well as the physical and economic, sciences will tend to correct the tendency toward overmechanizing which results from modern production methods.

The old arguments for the bettering of labor's lot were limited to a plane of mere materialism. Yesteryear the talk all centered about the so-called living wage. While sociologists never have come to full agreement as to just what constitutes a living wage, nevertheless it is apparent that the earning capacity of the individual has increased many times over with the ever more efficient production systems of the past decade and a half. But that increased earning capacity has come at the cost of submerged individuality; standardization of every process, no matter how minute, until today there has arisen the danger that the man will be completely overshadowed by the machine; will become, in fact, a mere "Robot."

Mr. Young and other far-seeing executives decry this trend. They believe that the individual, who, after all, is the ultimate consumer, must be safeguarded from mental stagnation; must be encouraged and aided in his blind gropings toward self-expression. But considering the intangibility of the term living wage, it becomes evident that the desirability of a margin in the worker's income above the mere necessities of American living standards is much more evident than the method of determining what that margin should be. Furthermore, the mere paying of a cultural wage will not insure that the working classes will immediately acquire culture, any more than the mere exposing of a youth to a college education is proof positive that he is from that time forth and forevermore educated. To the mass of workers, left unguided in the effective use of an increased stipend, it would mean only a more impressive automobile or a more costly radio set.

To hit upon some means of exercising a wise and kindly guidance in this direction which will not reek of offensive paternalism will present to Mr. Young and others of the same high caliber of executive leadership a task of no mean proportions. His recent statement may be taken as indicative of the changing attitude of progressive American industry today. There may be here that broader groundwork for industrial peace that is sought not only in America but throughout the world. To build on it an economic structure for bringing this desired condition of more universal culture into the realm of actuality needs deeper and broader thinking than has characterized industrial relations in the past.

New Cars for Grand Rapids Being Delivered



An effort to incorporate beauty and smoothness of line into car design was made in the new Grand Rapids cars. Horizontal bands of color are carried continuously across the doors.

Effort to Popularize Street Car Service Results in Cars Designed to Compete with Other Forms of Transportation in Attractiveness, Comfort and Quietness of Operation—Developed from Three Competitive Designs Submitted Last Spring

DELIVERY of the first of a group of 27 new cars built for the Grand Rapids Railway by the St. Louis Car Company has just been made. These cars, details of which were worked out by the car builder under the direction of L. J. DeLamarter, vice-president and general manager Grand Rapids Railway, include what were considered the best features of the three sample cars submitted by competitive builders last spring and described in ELECTRIC RAILWAY JOURNAL of May 9, May 16 and May 23, 1926. Various features of the cars as now built were decided upon after exhaustive study of the three sample cars in an effort to learn the preferences of the riding public of Grand Rapids.

STREAMLINE EFFECT SOUGHT

Of outstanding interest to the electric railway industry is the attempt which has been made to improve the lines and appearance of the cars so as to make them attractive to the eye and a pride of the city in which they are to be operated. At the same time the interior has been given particular attention for the purpose of making a street car ride as comfortable as the limitations in the rate of fare charged will permit. It has been the opinion of Mr. DeLamarter that street car designers have an inherent advantage, both in the matter of dimensions and general structural limitations, over the automotive designer in providing a comfortable ride at minimum cost. This was one of the motives back of the effort to build an improved type of car for Grand Rapids. To emphasize the character of service offered with these cars the management will refer to them as electric rail coaches rather than street cars. The results which have been obtained may be judged from the accompanying illustrations.

Before the cars were built two complete models in wood to a scale of $\frac{3}{4}$ in. to the foot were made up by the car builder from the original drawings. On these models, which were described in ELECTRIC RAILWAY JOURNAL for May 8, 1926, page 806, the lines of the car were perfected so as to give as nearly as possible a continuous streamline appearance that would eliminate the many awkward breaks and angles that are frequently present on older types of cars. These models also served to work out painting combinations which would emphasize the streamline effect that was sought. As a result of this preliminary study, numerous slight changes were made for improvement of the appearance that were not apparent on the ordinary working drawings.

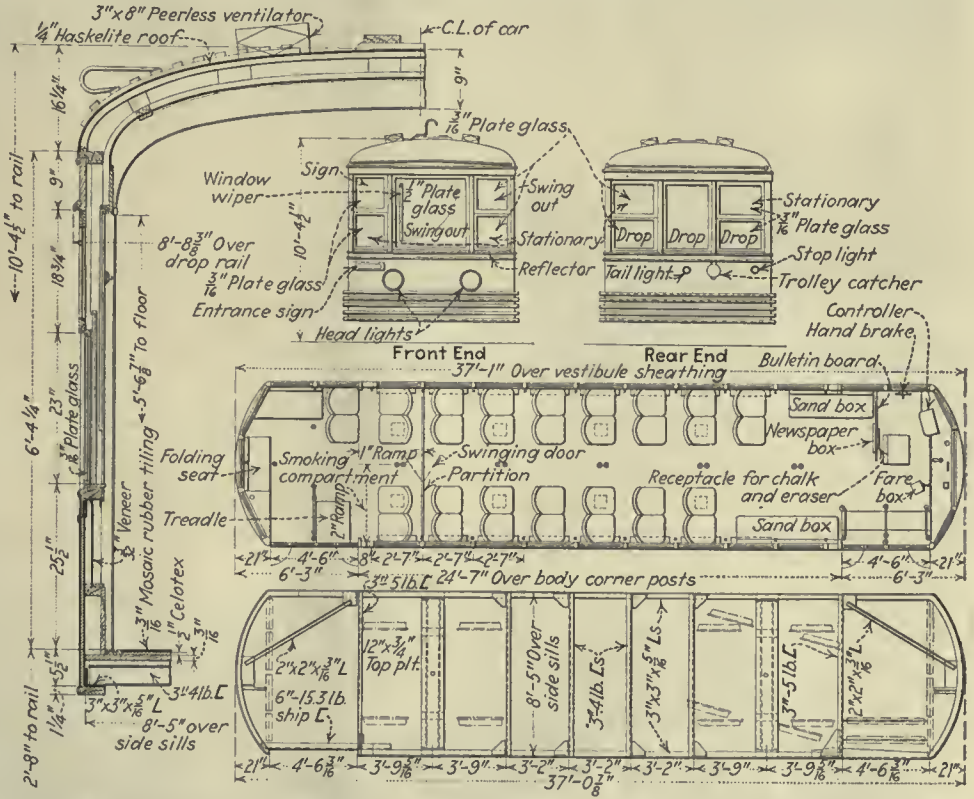
SKIRT AROUND BOTTOM

Experience with the three sample cars originally submitted last spring led to the adoption of a skirt extending around the car below the body. In working out this construction, however, the skirt has been streamlined with the step and the front entrance well. Three different combinations of exterior color are used to

designate the cars for three different routes. Solid bands of color are carried horizontally throughout the length of the car, and this effect is further emphasized by moldings which act as division lines between colors. The colors on the letterboard, belt rail and side panels are extended horizontally across the doors to obtain the streamline effect sought.

On a group of thirteen of the cars the side panels are blue with a light green skirt, blue letterboard and gray roof. On all of the cars the posts between belt rail and letterboard are painted cream. A broad 4-in. band is set off at the belt rail line by half oval molding and is painted red continuously around the car. This band will be adopted for all cars on the system. It blends into a cowl at the top of the front dash which contains five lamps for illumination at night. The color combination on nine cars consists of pigskin panels, desert sand skirt and letterboard, combined with red roof and belt rail bands. On five cars the side panels are desert sand color with a red skirt, letterboard and belt rail band. In this combination a gray roof is used.

Interior finish of the cars is in natural mahogany with white ceiling. The seats are of twin bucket type with double cushions, designed to provide the maximum in passenger comfort. These seats, which were furnished by the St. Louis Car Company, are upholstered in gray Spanish leather on fourteen cars and in gray Kemi-Suede on the remaining thirteen. The total seating capacity is 42. Of this number ten seats are located in a rear end smoking compartment, which is partitioned off from the remainder of the interior.



Plymetl Side Panels Are Used Outside of the Fourteen-Gage Steel Side Girder Plate on the Grand Rapids Cars. One-half Inch Thick Celotex, Both in the Sides and Floor, Is Intended to Deaden Noise and Provide Heat Insulation. Arrangement of Sash at Front and Rear Ends Is Shown in the Upper Views.

The cars are designed for single-end operation. They are arranged for one or two-man service, or may be handled by one man with street fare collectors. All apparatus at the front end is inclosed in a special control cabinet. The operator has a full upholstered seat and the platform controller is dropped down in the floor to put the top at a convenient height for the seated operator. The Peacock hand brake is at the left of the operator instead of in the customary position in the right-hand corner of the vestibule. Green and black mosaic rubber tiling covers the entire floor, including the vestibules.

Inside Step at Front End

Platform and body floors are continuous. A 2-in. ramp leads from the center line to the side sill at the rear end. Inside step construction at the front end gives very low step heights of 11 in., 10½ in. and 10½ in. respectively from the rail to the top of the floor. The latter is 2 ft. 8 in. above the rail. Folding steps are used at the rear end. An automatic treadle controls the rear exit door. Full safety car devices are included. There is also a selector valve attached to the M-28 brake valve for selective operation of the front folding doors. A conductor valve on the stanchion at the rear end controls the rear entrance door when the car is operated by two men. A back-up device furnished by the St. Louis Car Company is included in the equipment so that the car may be temporarily operated from the rear end for switching purposes.

Special St. Louis Car Company equalizer type trucks in which the journal boxes are rigidly clamped into the cast-steel equalizer frame are used under the cars. The truck side frame rides in guides in the equalizer casting instead of having the customary type of pedestal construction. The design is arranged so that either friction or roller type bearings may be used by interchanging a friction box for a roller box or vice versa. Provision is also made for application of a drum type brake if this is found desirable. Two of the 27 cars will be equipped with Hyatt bearings and two with S.K.F. bearings. An accompanying illustration shows the general truck construction.

Four GE-264 motors are used per car. Twenty-three of the cars are equipped with G.E. silent gears, in which a hollow web is filled with noise-absorbing material. The remaining four cars are equipped with Tool Steel gears with asphaltum pads bolted to the sides of the webs to deaden noise. Davis cast-steel wheels are made with six cored holes in each web. To three of these rubber pads are bolted to deaden the ringing of the wheels in service.

Care has been taken in the body construction to deaden noise as far as possible. The ⅛-in. pine floor is covered with a ½-in. layer of Celotex and then with



Pleasant Surroundings and an Air of Comfort in the Interior Are Designed to Attract Riders. View Looking Forward Toward Operator's Position



Looking Back Toward the Smoking Compartment at the Rear End. Preliminary Experiments Proved the Popularity of This Arrangement

⅜-in. rubber floor tiling. A 14-gage steel plate is used on the outside of the side posts and is stiffened by two angle pressings riveted to the plate at each post. One-half-inch Celotex is applied to the outside of this plate and covered with Plymetl outside panels. On the inside the side girder is also covered with ½-in. Celotex and then with three-ply veneer inside lining. The roof is of Haskelite, covered on the outside with Kemi-Suede, Around the bottom of the car the skirt is intended both to improve the appearance by concealing part of the running gear and also to deaden running noise by confining it under the car. On each side of the trucks the skirt is hinged in sections, which can be raised to make the truck and motor equipment more readily accessible for inspection and repair. These hinged sections are arranged so that when in service they are rigidly fastened in place by appropriate clamps to form a continuous structure around the bottom of the car.

The cars are 37 ft. ⅜ in. long over all, 24 ft. 7 in. over body corner posts, with side post spacing of 31 in. and nine body side windows. They are 10 ft. 4½ in. high from rail over top of roof and 8 ft. 5 in. wide over side sills. The weight completely equipped for operation is 29,500 lb.

In the body the upper sash is permanent and the lower sash is brass, glazed with ⅜-in. plate glass and



At the Rear End Is an Automatic-Treadle-Operated Exit with Folding Step. For Two-Man Operation an Entrance Door Controlled from a Conductor's Valve on the Platform Is Provided



Inside Step Construction Is Used at the Front End. Apparatus Is Inclosed in a Special Control Cabinet and the Operator Is Provided with a Comfortable Seat

Details of Specifications for New Grand Rapids Cars

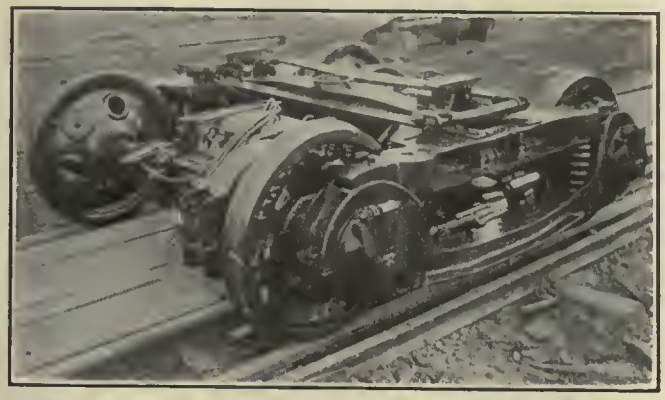
Number of cars	27
Length over all	37 ft. ⅞ in.
Length over body	24 ft. 7 in.
Width over side sills	8 ft. 5 in.
Height over roof	10 ft. 4½ in.
Seating capacity	42
Side post spacing	31 in.
Weight complete	29,500 lb.
Body builder	St. Louis Car
Trucks	St. Louis equalized E1 B-58
Motors	Four G.E.-264-A
Control	Single-end G.E.-K-35-KK
Air brakes	Westinghouse
Compressor	G.E.-C.P. 27
Safety equipment	Safety Car Devices Company
Anti-freeze device	Anti-Freezer
Body side panels	Plymetl
Body insulation	Celotex
Back-up device	St. Louis Car
Curtain fixtures	National Lock Washer
Curtain material	26 cars, double-faced Pantasote; 1 car, Kemi-Suede
Destination signs	Keystone
Door equipment with automatic exit	National Pneumatic Company
Energy-saving device	Economy Meter
Exterior paint	Krakno, R. F. Johnson Company
Fare box	Woods
Floor covering	Manhattan Rubber Company ⅛-in. mosaic tile
Gearing	23 cars, G.E. hollow web; 4 cars, Tool Steel long and short addendum
Gongs	12-in. Pneumatic Electric Service Supplies
Hand brakes	Peacock staffless, aluminum handle
Hand straps	National hand holds
Heaters	Railway Utility truss plank
Headlights	Ohio Brass (two per car)
Interior finish	Mahogany
Interior hardware	Aluminum
Illumination	Brascolite center dome fixtures
Passenger buzzers	Farraday
Roof	Haskelite
Roof covering	Kemi-Suede
Sash	Curtain Supply Rex Brass
Seats	Twin bucket, St. Louis Car
Seat material	Thirteen cars, Eagle-Ottawa Colonial Leather; Fourteen cars, L. L. Wolf Kemi-Suede
Slack adjusters	Westinghouse Form E
Step treads	Kass
Stop light and flashing signs	Oskel Equipment Company
Stanchions	Porcelain enamel
Trolley catchers	Ohio Brass
Trolley base	Ohio Brass
Trolley wheels	More-Jones
Thermostat	Railway Utility
Ventilators	Peerless
Wheels	Davis One Wear
Scrapers	Root No. 8
Window wiper	St. Louis Car
News vending box	Read Wyl U Ride Company
Wiring conduit	Duratube, Tubular Woven Fabric Company

arranged to raise. Front and rear vestibule windows are also glazed with ⅛-in. plate glass and the sash are arranged as shown in the accompanying illustrations. The motorman's sash at the front end is a single large brass frame glazed with ½-in. plate glass and hinged at the top so that it may be swung outward similar to a windshield. Two headlights with automobile type lenses extend out from the front dash. Five-bar automobile type bumpers are carried at both front and rear ends.

Duratube is used for control and body wiring. The wiring installation is in general accordance with the new code for car wiring recently adopted by the Board of Fire Underwriters. Heaters are installed in the truss plank. Lighting switches are mounted inside the control cabinet at the front end with a small trapdoor in the top for ready access by the car operator.

Five Brascolite double-lamp fixtures are arranged down the center of the body for interior illumination and are each equipped with two 56-watt lamps. There are five 56-watt lamps under the dash hood for illumination of the front dash and two circuits of 23-watt lamps for auxiliary lights. An "enter at the front" illuminated sign is installed in the front dash under the destination sign and an illuminated "exit at rear" sign is carried in the interior on the header at the front of the body. A stoplight is used at the rear end. All three of these devices, furnished by the Oskelite Company, are flashed on and off with the operation of the car brakes. One complete circuit of 23-watt lamps is used for their illumination. The other auxiliary circuits illuminate the destination signs and step lights at both front and rear ends. The step light at the front end is mounted on the outside of the door header with a special marker lens in the housing, which is of different colors to designate routes.

Back of the operator a substantial mahogany bulkhead frame is provided as a shield from the body lights at night. This carries a blackboard for news bulletins to passengers. Newspaper vending boxes furnished by the Grand Rapids *Herald* are carried below the blackboard.



The Special Type of St. Louis Truck Has a Cast-Steel Equalizer Frame in Which Are Rigidly Clamped the Journal Boxes, Interchangeable for Friction or Roller Bearings. The Truck Side Frame Proper Rides in Vertical Guides Cast in the Equalizer.

On the sides of the cars the names of prominent Grand Rapids pioneers and early residents are lettered. This plan is intended to identify the railway with the progress of the community. Some of the cars are named for the various high schools and in those cases the school colors are carried in appropriate pennant design.

The principal dimensions and specifications are shown in the accompanying tabulation at the top of this page.



Automobile Type Bumpers and Double Headlights Give the Front of the Grand Rapids Cars a Novel Appearance. The Cowl at the Top of the Dash Incloses Five Lamps for Illumination

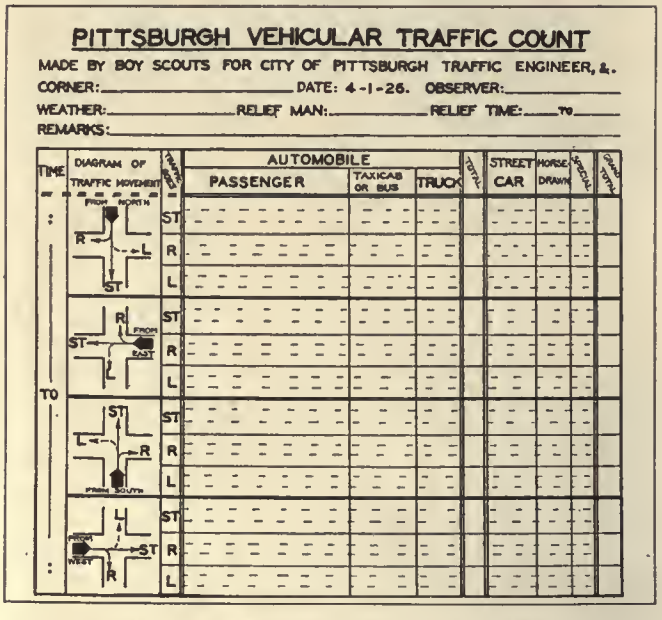
Pittsburgh Boy Scouts Aid Traffic Survey

Some 400 Sturdy Boys Volunteered and Made a Good Job of Checking Vehicles Downtown and at About Fifty Other Important Corners

SEVERAL months ago the desirability of making a check of vehicular traffic in the downtown district of Pittsburgh was discussed by the traffic engineer of Pittsburgh and the Pittsburgh Railways officials. There was no question about the need for such a count, but there was hesitation as to the amount of money that could be assigned for this study.

Service being one of the basic principles of scouting, it occurred to B. W. Marsh, traffic engineer, that the cost problem might be solved through enlisting the aid of the Boy Scouts, since the latter combined the necessary qualities of civic spirit and conscientious obedience to instructions.

To this end conferences were held by Mr. Marsh, the executive staff of the Boy Scouts and representatives of the Pittsburgh Railways. The Scout executives agreed



PITTSBURGH VEHICULAR TRAFFIC COUNT

MADE BY BOY SCOUTS FOR CITY OF PITTSBURGH TRAFFIC ENGINEER, &.

CORNER:_____ DATE: 4-1-26. OBSERVER:_____

WEATHER:_____ RELIEF MAN:_____ RELIEF TIME:____TO____

REMARKS:_____

TIME	DIAGRAM OF TRAFFIC MOVEMENT		AUTOMOBILE				STREET CAR	HORSE DRAWN	MOTOR CYCLE	BICYCLE
			PASSENGER	TAXICAB OR BUS	TRUCK	TOTAL				
:	FROM NORTH	ST								
		R								
		L								
	FROM EAST	ST								
		R								
TO		L								
	FROM SOUTH	ST								
		R								
		L								
:	FROM WEST	ST								
		R								
		L								

Upper Half of Traffic Count Sheet Given to Each Scout

to co-operate. In lining up the Scouts, the boys filled out applications for this public service and their parents signed application cards giving them permission to perform this service.

The plan met with such favor that there was no difficulty in securing some 400 lads, who were placed in charge of about 30 supervisors. Fifteen of these supervisors were railway men and the remainder were scoutmasters and city officials.

The only expense attached to the services of the Boy Scouts was their transportation to the two preliminary meetings on Saturday afternoons, which, in addition to their transportation on the day of the survey, was furnished by the railway. Lunches on the day of the survey were paid for by the city. Also, to the seven boys who made the neatest reports, the following prizes were distributed: Wrist watch, compass, hatchet, canteen, mess kit, signal kit, scout knife.

The check was made on Thursday, April 1. Although this turned out to be a raw, frosty day, with whirling snow, the Boy Scouts were so intent on "doing their stuff" that it was difficult to persuade them to make use of available shelter. As a rule there were two boys per intersection, but three or four, and occasionally five, were assigned to the busiest corners, dividing the work according to directions from which traffic originated and to kinds of vehicles. Relief boys were also assigned to aid each of five sentinels in turn. The sturdy and intelligent bearing of the Boy Scouts did not go unnoticed in the newspapers. The *Chronicle-Telegraph*, in fact, ran a laudatory editorial headed "Right on the Job." The boys used in this work were between the ages of twelve and eighteen years. Their reports were filed the very same day.

At two meetings preceding the survey the Boy Scouts were carefully instructed as to what was expected of them. Each checker was given a plan of an intersection and advised how to orient himself and where to stand in making the counts. Each checker also received a set of forms ruled and printed to make it easy to record the type and number of vehicles passing and to show whether the vehicles went "ST" (straight), "R" (right) or "L" (left). A portion of one of these forms is reproduced.

A set of mimeographed instructions was also handed to each boy for advance study and questioning. Among the points mentioned in these instructions were the following:

Place troop number, address and telephone number on the traffic count sheets. (Twenty-five sheets were furnished, four as spares.)

Be supplied with a watch, at least two sharpened pencils, a jack-knife and an eraser.

Report at post 7:30 a.m., Thursday, April 1, regardless of weather.

Stand at the curb; never in the roadway.

Each one of the forms for "Vehicular Traffic Count" covers two fifteen-minute periods.

The system of marking is to make groups of four vertical lines crossed by single horizontal lines.

All Michigan Railway Employees Solicit Freight

GETTING more freight shippers to use the lines of the company is the purpose of a new organization of its employees formed on April 15 by the Michigan Electric Railway, Jackson, Mich. Already a surprising number of prospects have been listed. The railway has agreed to pay its men 5 per cent on the gross new business thus developed.

The employee personnel has been divided into nine divisions, each division having a chief and an assistant chief. The former appoints captains and the captains in turn select five or more field solicitors. Freight agents are included in the latter classification. All employees except traveling freight solicitors and the officers of the company participate in the plan.

When the individual finds a new prospect, he fills out a blank furnished by the company, giving the name of the shipper. One copy is sent to the main office, one to his chief of division and one to his captain. The copies sent to the captains are turned over to the regular traveling freight solicitor for that particular division, who then calls on the new prospect. If it develops that the prospective shipper actually does use the service afterward, 5 per cent of the gross new business thus developed is paid to the solicitor.

P.R.T. Plans to Carry 62,000 an Hour at the Sesqui-Centennial

Public Transportation to the Exposition Grounds and Inside Will Be Cared for by the Philadelphia Rapid Transit Company—Information Booths Established Throughout the Grounds and in the City — Approximately $2,000,000 Has Been Expended by the Company in Preparation, 90 per Cent of Which Is a Permanent Outlay

By Edwin F. Thayer
Assistant Editor ELECTRIC RAILWAY JOURNAL



Airplane View Taken Several Weeks Ago, Looking to the Northwest

The stadium is pictured in the immediate foreground, while the auditorium, located just to the west of Broad Street, may be seen in the upper right hand corner. Pattison Avenue (east and west) bisects the middle of the picture and the construction work on the main loading terminal is shown under way at the extreme right. The "Gladway" for amusement concessions is in the open space at the upper center, while to the left center may be seen the India Building and the Street of '76.

FROM a pictorial standpoint the Sesqui-Centennial Exposition, opening on May 31 in Philadelphia, holds much of interest. But from a transportation standpoint it perhaps offers even more to stimulate the fancy of a railway man. When one turns over in his mind the thought that the numbers of visitors who are expected to come to Philadelphia are variously estimated at from 65,000 to 150,000 per day, it becomes evident that the conveying of these crowds to and from the exposition grounds will prove no small task. Furthermore, the visitors must be transported in addition to Philadelphia's regular heavy traffic and over streets congested with thousands of private automobiles.

The fame of the Sesqui-Centennial has been heralded to the Antipodes. This colorful drama is expected to draw millions of visitors from every corner of the country and from every section of the world during the six months of its history. Buildings of imposing size and elaborate decoration constitute the physical plant that has been erected at great expense. In the southeastern corner is a mighty stadium, capable of seating 100,000 spectators and of accommodating many thousand additional standees. There is also a large auditorium that will seat 20,000 people. These two structures will handle most of the important events that the exposition will boast, but in addition there will be countless other attractions to lure the visitor to the grounds.

Had the exposition been located in West Philadelphia, rather than to the south of the city, a large portion of the traffic problem might have been eliminated, for automobiles entering the environs of the city from the north or west and destined for the exposition grounds might have found ingress without having to traverse the main business district and the principal transportation arteries. With the present location practically every vehicle must pass through the center of the city and south along Broad Street or one of the adjacent thoroughfares, and it is over these identical streets that the Philadelphia Rapid Transit Company must operate its exposition cars and buses.

How to meet the great difficulties thrust in their path by this condition has been puzzling P.R.T. officials for several months. It required no major prophet to foresee many and many an exasperating traffic tie-up during the course of the exposition period, and the knowledge that these tie-ups would be due to conditions beyond their control, rather than to inadequate equipment, provided little comfort.

Full co-operation has been received from the city and Sesqui officials in scheduling exposition feature events so that peak hours for exposition crowds would not fall at hours when the regular city transportation is at its height. In other words, a big event which has been in progress in the stadium during the afternoon will be continued until after the downtown peak hour has passed or will be resumed again in the early evening. Thus two birds will be killed with a single stone, for the crowds will be kept off the downtown streets and the revenue of food venders on the grounds will be materially increased.

An outlay of approximately $2,000,000 is being made by the local railway company in providing tracks, loading terminals, intramural bus equipment (for transportation within the exposition grounds) and miscellaneous equipment which will serve directly in accommodating the city's guests. In addition 50 street cars and 135 new buses have been ordered. These are to be used in supplementing the present rolling stock in use in Philadelphia and environs and in providing adequate service for the Sesqui-Centennial. Of the $2,000,000 expenditure approximately 90 per cent will constitute a permanent outlay, for practically all of the track being laid on Seventh and Tenth Streets and on various east-and-west streets in the vicinity of the grounds will be left to serve the stadium, after the exposition proper is a thing of the past. It is probable that all loading stations, other than the main one at the Pattison Avenue entrance, will eventually be abandoned and the tracks at those points relaid for through service.

Throughout the summer and fall months a host of important spectacles have been scheduled for the stadium and auditorium on the grounds. To meet the heavy peak conditions which these events will occasion, the railway has available street car and bus equipment which will be able to handle approximately 62,000 persons per hour. Of this total, 52,000 will be cared for on the several street car lines leading to the grounds, while the remaining 10,000 will be carried by bus to the various bus terminals located in the vicinity of the exposition.

To date it has not been possible definitely to determine just what the bus routes will be, although it is known that all buses will follow a single general route to the vicinity of the grounds and will there be directed to the various loading stations.



Intramural Bus Equipment to Be Used Within the Exposition Grounds

The tracks on Broad Street, which previously served the League Island Navy Yard, have been abandoned. They bisect the exposition grounds and it was desired to keep all forms of transportation, other than the intramural buses, out of the area set aside for the exposition. Now the Navy Yard is being served by tracks laid on Eleventh Street south from the Pattison Avenue trolley terminal and bordering the stadium grounds.

Cars are in operation over the tracks on Tenth Street at the present time, but the Seventh Street line will not be completed for several weeks, due to the great delay in getting under way with the street opening projects. The railway has been close on the heels of the city with its track-laying gangs ever since the street opening began, laying track almost before the grading had been finished. The city has been doing all of the grading work and has supplied the sub-grade and carried on the paving work. The company has been responsible for the laying of its tracks and for erecting the overhead line.

Due to the difficulty experienced in obtaining crushed rock for grading and ballasting purposes it has been





At Left, One of the Inclined Ramps Leading to the Pattison Avenue Loading Platforms. At Right, Some of the Special Trackwork at the Pattison Avenue Terminal

found necessary to use almost any material which came to hand. Furthermore, although intended to be permanent in nature, it was necessary to lay track over a sub-grade which had not been given time to settle properly and early rehabilitation expense is anticipated.

The main Pattison Avenue terminal is equipped with four concrete loading platforms and is capable of accommodating sixteen Tenth Street cars simultaneously. Passengers will reach these platforms by an underground passageway with ramps leading up to each. Between this terminal and the loading platform at Pattison Avenue and Broad Street, which will handle six Seventh Street cars simultaneously, storage tracks will make it possible to keep a reserve of 170 cars available to handle large crowds assembled for feature events in the stadium or elsewhere in the grounds. Some cars on Tenth Street will of course be operated for through service to the Navy Yard.

None of the loading platforms and terminals will be covered, as from the standpoint of economy it did not seem advisable to make this additional outlay. Furthermore, the lack of time made it essential to concentrate every effort on matters of more fundamental importance.

From the standpoint of the company, the Pattison Avenue entrance to the grounds will be the most important one. While the so-called main entrance is located at Broad Street, between the Auditorium and the Palace of Liberal Arts and Manufactures, the events which will attract the largest crowds will probably be those held in the stadium, and the Pattison terminals will handle most of that peak traffic. Additional loading stations have been constructed at Pollock and Marvine Streets and just west of Broad Street. These stations will handle visitors destined for or coming from the Broad Street entrance to the grounds.

An exclusive concession to handle all public transportation within the exposition grounds has been







Work Being Rushed on the Trackage Which Will Handle Street Cars in the Vicinity of the Grounds

1. Construction of the storage tracks at Pattison Avenue. These will accommodate a reserve of 170 cars.
2. Laying four lines of track on Pattison Avenue to care for the Tenth and Seventh Streets traffic.
3. Construction work on the Pattison Avenue terminal loading platforms. The substation to provide energy for the railway lines and for general exposition purposes is shown in the background. The substation has a capacity of 4,000 kw.

awarded to the railway. Due consideration was given to the matter of equipment for this service and, in view of the crowded walks over which the units would be forced to operate, the frequent stopping and starting to which they would be subjected and the necessary low speed of operation, it was decided to use storage-battery equipment. Twenty-five standard Commercial Truck chassis were purchased. Special bodies for these were built by the J. G. Brill Company of Philadelphia. Originally it had been intended to use a much lower chassis, but it was found that the type of uneven roadway over which the buses were to be operated would not permit. Furthermore, the Commercial Truck chassis may be converted for regular trucking service when the exposition is over.

The bodies of the present equipment give the impression of long and rakish lines, however. Longitudinal seats facing outward and with a runway down the center of the bus and between their backs are provided. These extend from the front to the rear fenders, and seats for two additional passengers are provided over each of the rear fenders. The conductor passes up and down the center runway for purposes of fare collection. The heads of the passengers are protected from the beating sun by a gaily striped canopy. The bodies of the buses are painted with the conventional P.R.T. colors—green and cream yellow—while the operators and conductors are uniformed in a distinctive Sesqui-Centennial apparel. The buses have been nicknamed "PaRTycars."

The buses are 33 ft. in length, the distance from running board to the street is 7 in., the over-all width is 90 in. and the over-all wheelbase is 24 ft. The Philco batteries used in the buses give a fifteen-hour operating period with intermediate boosting service. As it is impossible to remove the batteries for charging, due to the special body construction, it was necessary to arrange for this system of boosting, which would permit of bringing the units into the charging headquarters at intervals during the less-busy hours of the day to boost the battery charge somewhat.

Intramural Service Building

A shed has therefore been constructed which will accommodate six buses for booster service and general maintenance. This plant and the office for the receiver and superintendent of this equipment constitute the only structures within the exposition grounds proper which are allocated to the intramural equipment. The building contains two generators of 100 kw. and 125 kw. respectively, panels and all equipment necessary for charging the buses. Provision is made to charge the entire fleet of 25 units simultaneously.

Dual 5-in. pneumatic tires are on the rear wheels and single 5-in. tires on the front. Each bus is equipped with two motors driving the rear wheels by means of concentric gearing. They have a maximum speed of 8 m.p.h. and an average speed of 6 m.p.h. The front wheels are adequately protected by bumpers. A Northeaster non-shrill horn is used, as it is desired to warn, rather than to frighten, the dense masses of pedestrians with which the buses will be forced to contend.

The operators and conductors are new men, specially employed for the period of the exposition. They are largely students who are experienced in handling automobiles and who have been specially trained for these unusually long buses. The entire force for the intramural buses consists of 65 operators and conductors, seven mechanical men to handle the shop equipment, a receiver, a clerk, and a supervisor.

Final determination of the routes within the grounds to be served by the intramural buses has not been made even today. Decision on this point will be influenced by traffic conditions as they develop, by the degree of popularity which is accorded to the equipment and by various other local conditions. Cash fares of 10 cents will be collected universally and no transfers will be issued. It is the hope of P.R.T. to be able to break even on this intramural venture—as a money-making undertaking it has never seemed feasible.

Information Service Provided by P.R.T.

Seven information booths have been erected at strategic points in the exposition grounds by P.R.T. These booths are manned by expert information men who have been in the service for years. In addition P.R.T. is training a force of men for service at large conventions, it being planned to have a man specially detailed to be present at conventions held in the city to supply all types of transportation information to the delegates. One man will be located at the Baltimore & Ohio Railroad Station to furnish information, and there will be a man working in the city hall square in conjunction with Sesqui-Centennial Housing Accommodations, Inc. This organization has the exclusive housing concession in Philadelphia during the exposition period and has undertaken to supply every visitor who requests a room with the type of lodgings that he desires. The P.R.T. information man will be on hand to direct the stranger to his portal for the night. The Housing Corporation will have representatives in every department store, and thus P.R.T. will be in touch, indirectly, with these bureaus.

All in all, more than 25 railway men will be engaged in this type of service. This number includes a highly-skilled man who will be constantly on duty at the general switchboard in the central information office. He will answer questions phoned in, either by the public or by the field information men who have been stumped by some particularly knotty question. While this service will indirectly work to the benefit of the street car company, it is a real contribution to the success of the exposition as a whole, for the information men will be expected to answer thousands of questions that have absolutely no bearing upon matters of transportation. Copies of the special Sesqui-Centennial edition of *P.R.T. Traveler* will be on sale at all of the branch information offices of the company and will also be supplied by conductors and subway-elevated cashiers.

Various estimates place the total expected attendance at the Sesqui-Centennial at between 25,000,000 and 35,000,000. Great haste has of necessity prevailed in laying some 6 miles of track, erecting terminals, employees' waiting rooms, information booths, and a substation, and in perfecting the general operating plan for the exposition period to handle the expected throngs. Yet for all that haste the transportation facilities that have been provided in so short a time show remarkable accomplishment. The job is not finished yet—nor will it be completed until the months of winter have chilled the gaiety which was the Sesqui-Centennial and relegated it to the shelf of memories. But in the meantime there is "something doing" in Philadelphia.

Better Car Routing and Traffic Control Proposed for Baltimore

SECOND ARTICLE

Revision of Car Routing and Traffic Control Methods Are Proposed by the Engineers to Reduce Congestion in the Business District—A Major Traffic Street Plan Is Presented that Is Intended to Relieve the Present Inadequate System of Thoroughfares

SOME 80 per cent of the lines of the United Railways & Electric Company of Baltimore are operated through or looped in the central business district. As there are many narrow and but few continuous east-and-west streets, many turning movements and an uneven distribution of service naturally result. In this area, as in other portions of the city, competitive construction and ownership of tracks has in many cases resulted in circuitous routes designed to reach certain parts of the downtown area. It appears that these routes have been modified or changed from time to time, but, as in other cities, the tendency of public opinion has been to prevent the making of changes as long as possible.

From a study of the data collected by the engineers, Kelker, De Leuw & Company, and referred to in the article published in ELECTRIC RAILWAY JOURNAL for May 22, page 883, several alternative plans for routing were prepared, based on the following principles:

PRINCIPLES OF ROUTING CONSIDERED

1. The discontinuance of street car operation on certain streets to provide for greater freedom in movement for other street traffic.
2. An even distribution of car service so as to provide the maximum opportunity for future increases.
3. A reduction in the number of turning movements throughout the downtown area, especially in the congested zone.

There are three factors in the routing of street cars, apart from topography and street layout, which contribute largely to street congestion. They are, in the order of their importance: (a) Left-turn movements, (b) right-turn movements and (c) the attempt to operate more cars over any street in a given period of time than the existing traffic conditions will permit. Working under the limitations imposed by the conditions, the recommended rerouting plan reduces the left-hand curves used by street cars in the district bounded by Center, Gay, Camden and Greene Streets from 49 to 33 (33 per cent) and the right-hand curves from 59 to 40 (32 per cent). In the most congested section of the downtown district, that bounded by Saratoga, Howard, Baltimore and Calvert Streets, the left-hand curves are reduced from eight to two and the right-hand curves from seven to two, decreases of 75 and 71 per cent respectively.

The reduction in number of curves used, together with other changes made in the routing, will decrease the number of street car turning movements made daily in the larger areas as follows: Left-hand turning movements from 13,294 to 8,197, a decrease of 5,097 (38 per cent), and right-hand turning movements from 15,085 to 10,315, a decrease of 4,770 (32 per cent). In the most congested area the left-hand turns will be reduced from 2,261 to 789, a decrease of 65 per cent, and the right-hand turns from 2,617 to 789, a decrease of 70 per cent. The car flow charts reproduced herewith show the results with the present and proposed routings during the maximum half hour of the afternoon rush.

In the report the detail changes in the various routes, with the reasons therefor, are given, along with a list of the special work and tangent track required to make the plan effective.

LIMITED STOP PLAN

The general development of Baltimore, with subdivisions having blocks of from 300 ft. to 500 ft. in length, is the greatest cause of the low speed made by street cars. Street car stops are made at almost every intersection, and the frequency of the car stops when compared with the number of stops made in other cities is one of the outstanding features of street railway operation in Baltimore. The present number of stopping places per mile of single track within each mile zone measured from Charles and Baltimore Streets ranges from 13.12 in the first zone to 8.08 in the territory beyond the 5-mile zone, averaging 10.22 per mile of single track for the entire system, as compared with slightly more than eight in Washington and in Chicago. The diagram of the residential distribution of those persons using the street cars (see page 885, issue of May 22) shows that service to accommodate the majority of them and of the persons using automobiles must be given by operating cars over the principal streets radiating from the central business district. It follows that any measure which can be adopted to secure faster speed with safety will benefit the two largest groups of people using the streets.

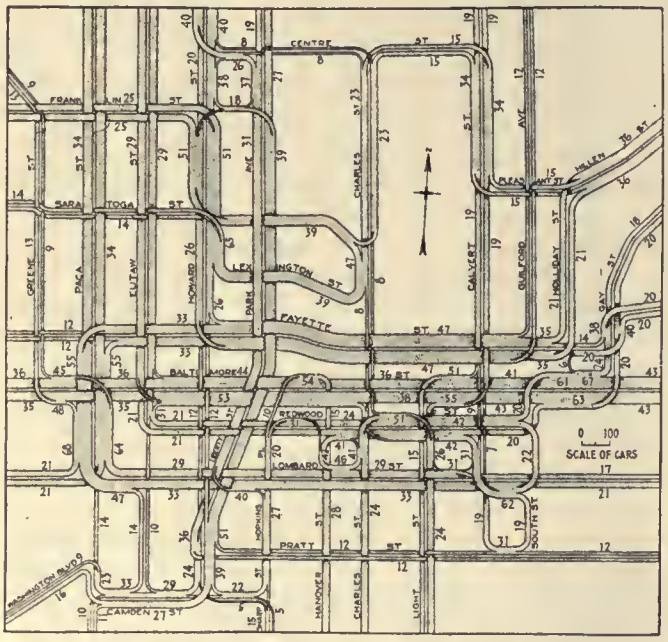
Widening of streets, though expensive, will be necessary in many cases if the time spent in traveling between home and office, store or factory is not to be greatly increased in the future. In the meanwhile the traveling time can be reduced for the majority of workers if some of the steps were eliminated during the morning and evening rush hours. It is recommended in the report that a limited stop service be inaugurated between 6 and 9 a.m. and between 4 and 7 p.m., and that in these periods the stopping places be adjusted so that the average number of possible stops for the entire system be as nearly eight per mile of single

track as practicable, and that during all other hours of the day and night the stopping places remain as at present.

TRAFFIC CONTROL

Traffic control is required on the streets and highways for the safety and convenience of the users and also to provide for the efficient use of the street space. With the advent of the automobile street traffic has increased tremendously, and this, together with the necessity of promoting safety, has led to a wide extension of the scope of traffic control.

The American tendency to concentrate many activities in a small area in the center of a large city is one of the outstanding causes of traffic congestion. There is crowding, both on the roadways and on the sidewalks. In a few of the larger cities there are sec-



Car Flow in Baltimore Business District with Present Routing. The Confusion Incident to the Many Right-Hand and Left-Hand Turns Slows Down the Cars and All Vehicle Traffic

tions where saturation has nearly been reached; that is, the crowding and congestion have become so great that the streets are being used almost to capacity, and in many other cities the use of available street space is approaching 100 per cent.

The principal impediments to the free flow of traffic along any roadway are those presented by parking, cross traffic, left-hand and right-hand turns. While it is impossible to eliminate the interference of cross traffic except by grade separation, it is possible to accelerate the movement of traffic by adopting a method of control which will give to the opposing traffic streams the requisite amount of time and no more. The movement of pedestrians at intersections, if uncontrolled, greatly slows down all traffic movement and at the same time causes a very dangerous street hazard. So-called jay-walking, or the unregulated crossing of roadways between street intersections, is not only dangerous but at times interferes seriously with the free flow of vehicular traffic on roadways.

One of the greatest annoyances to a driver of a motor vehicle is the left-hand turn. The right-hand turn, in itself, is seldom an impediment to roadway traffic. However, it is a source of danger and annoyance to pedestrians. There is frequently a clamor for the elimination of both right and left turns. People who have given the subject little thought would have them eliminated entirely, and proposals for the regulation of them vary all the way from this extreme to the prohibition of turning movements at a single intersection. The elimination or prohibition of left-hand turns at a single intersection simply removes this cause of congestion to an adjacent intersection and results usually in causing equal or greater congestion at a different place. Consequently the best results are obtained in nearly all instances in dense traffic areas by the prohibition of left-hand turns on a group of streets or through an area.

A lengthy section on various forms of traffic control signals is given in the report. Automatic signal systems are held to have certain advantages. They keep traffic under control and speed more uniform. They also have the tendency to cause drivers of vehicles to follow in their own lane of traffic more closely and there is less weaving from one lane to another on wide roadways. However, synchronized signals have their disadvantages, which ordinarily are not as apparent as their advantages. The time allowance for movement in each direction is necessarily a constant throughout the zone, being governed by the heaviest streets. When automatically controlled, it frequently happens that traffic is not moved as efficiently at some intersections as it would be were these intersections under individual control. This is particularly true of the movement of street cars. Another disadvantage in this type of control is the power peak caused by the possibility of almost half the street cars in the district starting at the same time.

The erroneous idea that synchronized automatic signal systems speed up the traffic is rather widespread. This is probably because higher crest speeds may be attained with safety after the installation of synchronous signals; but the increased standing time at intersections more than offsets the slight gain resulting from any increase in crest speeds.

One of the chief interferences offered to the free flow of vehicular traffic is the unrestricted movement of pedestrians. The pedestrian has certain rights, to be sure, but certainly the time has come when his habits and rights must be modified somewhat in his own interest and in the interests of all other classes of traffic. Where there is vehicular traffic control the pedestrians should be required to obey the signals.

Safety zones for the protection and convenience of car patrons have been established and are maintained at 104 points in Baltimore, 89 in the outlying districts and 15 in the central business district. Twelve of those in the outlying districts are of the raised platform type. The minimum width of a safety zone measured from the nearest rail should be 5 ft. and the minimum space required for vehicles to pass between a safety zone and the curb 8 ft. Where the roadway space between rail and curb is less than 13 ft. the sidewalk can be recessed and the curb set back a sufficient amount to provide the necessary space for a safety zone.

Parking regulations should be progressive in their steps, advancing in restriction as traffic increases. The complete prohibition in the downtown district of Baltimore is not necessary today, but must be considered as an eventuality. At the present time it is essential to

the city's best interest that the existing parking regulations be extended somewhat during the rush hours, but even an extended regulation will have to be modified from time to time to meet increases in traffic.

The recommendations for traffic control and parking are given in the summary at the beginning of the previous article (page 884).

Through Streets

The success of boulevard systems for pleasure cars, taxicabs and motor buses has led to a demand for a similar system of through arteries for the use of other classes of traffic. It is fully as important that commercial vehicles and street cars be afforded efficient and convenient thoroughfares as it is that pleasure cars be provided with them. A "through street" may be defined as any thoroughfare which carries all classes of traffic and which is protected by requiring all cross traffic to stop before entering them. Through streets have been found to serve a very useful purpose when carefully located.

In the establishment of a system of boulevards and through streets it must be borne in mind that too many restricted streets or a system which imposes so many boulevard and through street stops that they become burdensome will defeat its own objective. Where there are so many stops that motorists fail to observe the stop regulations, a situation is caused of much greater danger than were there no through streets.

A Major Traffic Street Plan

With one or two notable exceptions, the street system of American cities is the result of haphazard real estate development. Subdivisions have been made from time to time with one principal object in view—that of creating a unit which in itself would have an interior arrangement favorable to the selling of lots. The early highways carried very light traffic up to the advent of the automobile and were adequate to serve the needs.

Now all of this is changed. The volume of traffic which has resulted from the ever-increasing use of the automobile is bringing out clearly all of the defects of the early street plans, and today street plans are required that provide an adequate number of wide and well-paved highways to accommodate present and future traffic.

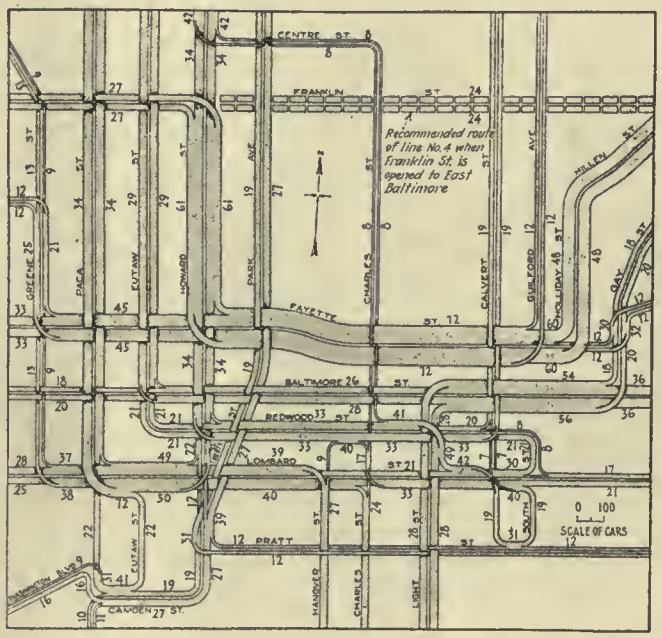
The streets of a city can be grouped roughly into two general classes—major and minor. In the first group are found those streets which, because of their location, furnish more or less direct routes from the central business district to centers in the outlying urban and suburban areas; those which by reason of continuity and the serviceable condition of their roadways are used as heavy traffic arteries; boulevards which form direct communication between parks and amusement and business centers, and business streets in the commercial and industrial districts. All other streets which connect the major streets, either directly or indirectly, may be classed as minor streets.

A system of major thoroughfares is composed of the following elements: (1) Distributor streets, (2) arterial thoroughfares, (3) inter-district thoroughfares, (4) boulevards and (5) business streets.

To reduce turning movements and unnecessary travel in the downtown area to a minimum a system of distributor streets just outside of and encircling a central congested area is required. Such a band of streets would connect with and articulate all of the important streets in the central area as well as the important thoroughfares radiating from it. Arterial thoroughfares are the principal traffic streets radiating from the central district to and through the urban residential areas to the suburban centers. Upon such streets is imposed the burden of carrying a large proportion of the traffic of the city. It is also important that a major traffic street plan provide traffic arteries connecting the various residential districts one with another.

A boulevard system should include streets touching or extending through the central business district and connecting it with the principal parks, playgrounds and residential streets, as well as to furnish easy access to the driveways in public parks.

Business streets are almost always street railway or bus line streets and, with the operation of these col-



With the Proposed Routing the Looping of Cars in the Central Area Has Been Much Reduced. Left-Hand Curves Are Reduced 33 per Cent and Right-Hand Curves 32 per Cent

lective transportation units and of other vehicular traffic, the highest traffic densities are found on them. Unfortunately these streets, which have the greatest need for ample width, are generally those upon which widening projects are almost impossible on account of the high values of land and buildings.

Determining Roadway Capacity

Roadway capacity is determined by the number of traffic lanes, the amount of cross traffic, the system of traffic control, the uniformity of spacing and speed of vehicles, the skill and habits of the drivers, the type of vehicle, weather conditions and many other factors. While it is possible to calculate, assuming ideal conditions, almost any capacity for a traffic lane, such conditions are never realized. Reliance must be placed almost entirely on actual tests and observations.

It is generally assumed that a lane for moving traffic requires a width of from 9 to 10 ft. Theoretically, the capacity of a 20-ft. (two-lane) roadway for traffic moving in the same direction is twice that of a 10-ft. roadway, the capacity of a 30-ft. (three-lane) roadway three times that of a 10-ft. roadway, and so on. Practically

the theoretical capacity of a wide roadway is seldom obtained. This is because vehicles going in the same direction weave back and forth from one lane to another, and also because the proximity of vehicles in adjoining lanes causes the driver to lengthen the interval between his and the preceding vehicle. Observations made on the Michigan Avenue Bridge, Chicago, during the maximum hour of the evening rush, show the following use of the three lanes: First lane, 100 per cent; second, 80 per cent, and third, varying between 50 and 60 per cent; making the combined use of all lanes less than 80 per cent of the maximum use of the first or inside lane. Other tests show somewhat similar figures. Counts in Baltimore showed no such degree of saturation.

From a comparison of the various counts and derived figures, it is concluded by the engineers that a single lane of a well-controlled boulevard has a capacity of about 1,500 vehicles per hour, and that 800 vehicles per hour represents the capacity of each lane of a roadway



Major Traffic Street Plan Proposed for Baltimore. The Proposed Plan Utilizes Existing Streets as Far as Possible so that a system of Arterial and Distributor Streets Can Be Provided with a Minimum Number of New Street Openings

carrying all classes of traffic with normal conditions as to interferences. On street car streets with no safety zones it is probable that the maximum capacity of a single traffic lane will be not more than 600 vehicles per hour.

Parallel parking at the curb requires a lane of about 7 ft. in width. Street cars usually occupy a lane of about 10 ft., and for safety and convenient movement of other vehicles a 9-ft. lane is required and a 10-ft. lane is much to be preferred. In planning roadways for future developments the following allowances should be made: 34 ft. for roadways of four lanes, 54 ft. for roadways of six lanes, 74 ft. for eight lanes and 94 ft. for ten lanes.

A space must be provided on each side of the roadway for parkway and sidewalk, or for sidewalk alone. This should be a minimum of 13 ft. and preferably more. Consequently, in planning streets for future requirements, the following minimum allowances should be made:

60 ft. for streets of four lanes
80 ft. for streets of six lanes
100 ft. for streets of eight lanes
120 ft. for streets of ten lanes.

In planning for the widening of streets in built-up districts it is usually found more economical to establish new building lines well in advance of the necessity. By anticipating the necessity for wider thoroughfares and the establishment in advance of new building lines along the property lines of the streets to be widened much of the usual expense of street widening projects may be avoided. If such new lines are established ten or fifteen years in advance it would be made certain that no new buildings would need to be removed and the cost of removing the old ones may not be excessive. This method is proposed for Baltimore.

Development of Baltimore Street System

Baltimore has had a steady and continuous growth during the last 60 years and the greater portion of the street system was developed long before the advent of the motor vehicle. The original plan, adopted in 1801, with but few changes, was apparently adequate for the traffic requirements for many years. Not until after the fire in 1904 were any major street improvements consummated. The fire destroyed all of the buildings in a considerable portion of the downtown district. The Burnt District Commission carried out a comprehensive program of street widening, most important of which was the widening of Light Street and Pratt Street. Huge sums have been saved through the execution of these projects at that time.

While there are many wide streets in Baltimore, they do not have the essential continuity which makes possible the most efficient use of the roadways. The early radial roads and highways, which seldom have adequate widths in the older portions of the city, are well located and furnish more or less direct communication between the different urban and suburban centers and the central business district.

Analysis of available statistics of traffic flow in the central business district of Baltimore and on the highways throughout Maryland indicate that there is a definite relationship between motor vehicle registration and the volume of traffic. The total number of motor vehicles entering and leaving the central business district has been taken by cordon counts in October of each year from 1922 on. The following table gives the number of vehicles counted, those registered and the ratio of these numbers:

TRAFFIC FLOW AND VEHICLE REGISTRATION IN BALTIMORE

Year	18-Hour Cordon Count of Motor Vehicles	Estimated Motor Vehicles Registered	Ratio
1922.....	117,000	44,500	2.57
1923.....	138,000	55,000	2.51
1924.....	146,000	66,200	2.22
1925.....	176,000	81,400	2.19

The ratio of traffic flow in the central business district to the total number of registered vehicles is decreasing, but at a diminishing rate. It is estimated that this ratio will decrease until it reaches 2.00 in 1928 and then remain about constant. Based on this estimate the vehicles entering and leaving the central business district, if the street space permits, will increase from 176,000 in 1925 to 308,000 in 1930, an increase of 75 per cent, and to 386,000 in 1940, an increase of 119 per cent. From other statistics it is estimated that the traffic on highways where there is sufficient room for free movement will increase in almost the same proportion as does the total number of motor vehicles owned and operated. In the outer portions of the city it is predicted that by 1930 the volume of this traffic will be about 90 per cent greater than that of today, and by 1940 it will be about 135 per cent greater. From the foregoing statements it must be clear that the present street system of Baltimore must be made adequate to care for the traffic increases of the near future.

The remainder of the report deals with the detailed recommendations for creation of major streets. These follow along the lines of the City Plan Committee. The proposed changes are shown in the large map reproduced herewith. In general the recommendations provide for a series of inner distributor streets, a system of outer distributor streets parallel to and a mile or more from the inner distributor street system, with arterial thoroughfares and connecting streets to link the various centers with the central business district.

Trainmen Make Safety Suggestions

Platform Men of Cleveland Railway Appointed Regularly as Safety Inspectors—Department of Accident Prevention Formed — Co-operation with Safety Council Results in Well-Attended Mass Meeting

ONCE each month either one, two or three crews from each station, depending on the size, are appointed by the Cleveland Railway to spend one day inspecting the physical properties, including the cars, track and street conditions. A written report is made of unsafe conditions that are found. While these reports are directed to the department of accident prevention, they are reviewed in a conference held each month by the general manager, division superintendents, traveling dispatchers, superintendent of car washers, general superintendent and two of his assistants.

Suggestions that bear further analysis are assigned definitely to some one for investigation. Many suggestions are obvious and are ordered into effect at once. If corrective measures cannot be put into effect the reasons are explained to the crew making the report. Each of the men serving on these committees wears a green and white enamel button reading "Accident Prevention Committee."

A recent report picked at random (dated Feb. 3) is

from one of the crews at the St. Clair station. It contains 23 suggestions which the committee believes will reduce accidents. To illustrate the nature and completeness of these suggestions, extending over four closely written typewritten pages, several are herewith reproduced as being typical of the reports of the trainmen's committee:

An inside grab handle is badly needed on the "1000" type cars, just outside of motorman's vestibule, in order that heavy, infirm and elderly people can board safely at the front door. The center-entrance cars have an inside grab handle and we believe they would be of great use on the "1000" type cars.

The water trough at Wheelock Road and St. Clair is always running over and then causes the street to be flooded with water. When it freezes, this place is very icy and dangerous. It seems as though the water is running too fast for the drain, which causes an overflow. The policeman on the beat ought to watch this trough more often and not let the drain get clogged up.

On the "1200" type cars there are two switch holes in motorman's vestibule that are being used by motormen who chew tobacco to spit the juice through. We have noticed that the front vestibule of these cars is cleaner and sweeter than the "1000" type. Many motormen are in the habit of expectorating behind the jack and behind the controller, rather than exerting themselves a little by opening the front door for this function. We believe, therefore, it would be a good thing in the way of sanitation if the company would put a hole in the floor of these cars near the gong at the right-hand corner, for the use of the tobacco-chewing motormen.

We believe the far-side stop, westbound, at E. 45th Street should be moved over to the near side of the street. This is a dangerous corner when the eastbound cars are unloading passengers and westbound cars are coming to the stop; the people run right in front of the westbound cars.

Since an automatic traffic signal has been installed at St. Clair and E. 105th, we believe that the eastbound cars should be brought up to the beginning of the bank building. At present, motorman stops car way back from this point and he might get the green light to go and before he gets up to the street the red light will be flashed against him and thus will have to stop and wait. We suggest also that the safety zone be extended up even with the bank building.

The accident report form now in use was in our opinion all right years ago when traffic was different. However, we believe it should be changed now to cover present times and conditions, such as a questionnaire form to include whether the driver of vehicle was intoxicated; make of vehicle; type of vehicle; number of passengers in vehicle; number of women and children; did driver make boulevard stop; rail condition; equipment condition, regarding brakes, sanders, etc. Also, another report for deadheading car caused by mechanical defects, to include such questions as, "Did conductor collect all fares; whether he gave out free transfers," etc. We believe the claim department should know about the defects, as some conductors when changing cars do not collect their fares and an argument ensues on other car.

Conductors claim that the reason so many slugs are being deposited for fare is because the table on fare boxes is generally dirty. A small light should be arranged to shine in fare box so they can see what is dropped in. The fare boxes on "1000" type cars are too low from the view of the conductor and he cannot see into fare box unless sitting on stool.

It seems that whenever a cable breaks from catching under the retriever, it is always one of the small size cables, and it catches in between the brace on retriever and retriever. These small cables should be taken off and larger or thicker cables put on or else there should be plenty of tape put on small ones so they will be larger.

A water drain is badly needed at E. 79th and Hough, southbound. The water comes from the hill and settles in the electric switch, and when motorman throws the switch the people are splashed with muddy water.

We suggest the discontinuance of eastbound East Boulevard stop and placing the Yale eastbound stop at Herrick Road. A traffic officer is stationed at this point and makes cars stop for Yale and Herrick Road traffic. The East Boulevard stop is useless where it is located as all the people live on the left side of East Boulevard.

We talked with Captain McMasters and Sergeant Nebe at the Fifteenth Precinct police station in regard to Moses' garage at St. Clair and Nottingham Road, and they said our complaint will be taken up with Mr. Moses. They told us they had many complaints about his parking violations, but this is the first one that came from the railway company.

The switch cover at E. 140th, north of St. Clair, is missing. This switch is where the Euclid cars used to wye.

Break in pavement at Larchmont switch.

Sand boxes empty at Brussells Road.

Car 923 has no hanger hook for run number.

Car 908—Retriever pulls trolley off on straight wire.

Car 917—Will not take the switch at E. 79th and Woodland.

Car 2073—No drawhead pin, front.

Car 2283—No rear screen.

Car 1025—Curtain off, front vestibule.

Car 1254—Curtain should be rewound in front vestibule.

Car 1035—Broken release spring on rear right truck.

We suggest that a lamp be installed in toilet at Euclid Beach Park.

From an examination of the several suggestions above, it will be observed that the trainmen have had some excellent ideas. Many other suggestions were made that referred to detailed operating conditions such as the elimination of certain stops, the change of safety zones and slight changes in the operation of the cars. Inspections of this kind have brought to light many minor defects and possible improvements that might otherwise pass unnoticed by the supervisory force who do not actually operate the cars.

From one of the suggestions, it is seen that the committee carried a matter to the Police Department. This has been done frequently by these platform committees, with excellent results.

Trainmen serving on these committees receive pay as if operating their regular runs. To them it is a pleasant relief from the routine of daily operation and gives them a feeling of taking an active interest in the company's welfare. This plan also brings to the notice of the company those men who are developing ability for a higher position.

Entirely apart from this inspection work are results that have been obtained by the increased co-operation recently with the Cleveland Safety Council on the part of the officials of the company. This Safety Council has been in existence for seven years. This year it has held a number of mass meetings. On Feb. 25 a general meeting of superintendents and foremen was held in the auditorium of the Chamber of Commerce Building, at which 1,200 people attended and 500 were turned away because of inability to crowd into the hall. Besides a talk on "The Philosophy of Safety" by Dr. Charles H. Rust of Worcester, Mass., an entertainment program was provided and attendance prizes were distributed. On the following evening, Feb. 26, a meeting of commercial drivers was held, with equally gratifying results.

While it takes some time to determine actually the results of such accident prevention activities, definite improvement has been noticed. A "no parking" ordinance has recently been passed and made effective during the rush hours. The ordinance requiring boulevard stops has been in existence for some time, but recently has been rigidly enforced.

The company has insisted that cars be under control while crossing special work and entering the subway under the high level bridge. The first tangible result to be noticed has been a reduction of 18 per cent of car collisions.

Texas Properties Are Getting Results from Good Merchandising Work

SECOND ARTICLE

Subsidized Bus Service Is Houston's Answer to the Problem of Providing Transportation Facilities to Newly Developed Communities — San Antonio Relies on Its Widely Extended Telephone Dispatching Service to Perform a Large Part of Its Supervisory Work — Coffin Prize Contest Attracting Attention

By John A. Dewhurst
Associate Editor ELECTRIC RAILWAY JOURNAL

ALERT police regulations are common to all Texas cities. One does not cross a street against the traffic signals with impunity. A near-by officer always challenges the offender and explains the purpose of the regulation of pedestrians. The courtesy by which this is done is of particular interest to the northern visitor.

This trait of courtesy has been carried perhaps farther in El Paso under the direction of Stanley Good, captain of traffic police of that city. He believes that speed with safety is not much slower than recklessness and proved it to its citizens by dashing across that city during a busy hour violating every traffic rule and regulation, passing cars on the left and generally doing all things a good motorist would not do. The trip took eleven minutes. He then made the same trip under similar conditions in a safe and sane manner, obeying all regulations, and it required thirteen minutes—two minutes more for safety.

Of outstanding merit has been the co-operation between the police department of El Paso and the El Paso Electric Railway. Much has been accomplished by the close co-operation between these two organizations in the regulation of traffic and the movement of the large number of passengers who daily ride the electric cars.

HOUSTON GROWING RAPIDLY

Houston has benefited tremendously by the completion of the ship channel that allows ocean-going craft to reach the city. Home-building projects in outlying territories are extensive and have placed a trying burden on the Houston Electric Company, operating the city transportation system in this fast-growing city.

Bus service has been supplied on eight different lines, five of which are complete routes from the center of the city to outlying districts, while the remaining three provide feeder service.

SUBSIDIZED BUS SERVICE IN HOUSTON

Subsidized bus service is operated on four lines at present. The three of these lines running into the center of the city are express buses, running without stop from the outlying districts to the city center. The other subsidized line is a feeder or extension service to a car line. The subsidized lines are clearly marked and the passengers know that the service depends on the subsidy from the real estate operators.

The basis for a subsidy is a contract between the railway and the real estate company, whereby the Houston Electric furnishes the necessary equipment and operates it. The real estate developers agree to pay all operating expenses, after first crediting all revenues collected. The operating expenses, including depreciation, are equivalent to approximately 28 cents a bus-mile. On the main lines the revenue has gradually increased and is now running at about 16 to 18 cents per mile. The Houston Electric Company reserves the right to take over any operation at any time and agrees to do so whenever the revenue equals or exceeds the expense for a period of six successive months. The permit to operate received from the city is granted from year to year. It is dated coincidentally with the annual contracts or renewals. The fare charged on all express buses is 10 cents cash with free transfers to cars or other buses. On non-subsidized lines or on regular buses, the same fare is charged as on cars, namely, 7 cents cash or four tickets for 25 cents.



"Courtesy Pays." This Device, Distributed by the Northern Texas Traction Company, Consists of Two Cardboard Disks. By Moving the Under Disk to Any Position Marked, a Picture Is Shown of the Accident that May Happen

To improve the service in general and to give better transportation the company is giving some thought to operating express service on other car and bus lines.

Many city cars are being repainted and electric flashing signs are being supplied, reading "We thank you," "Enter at the front," Leave by the rear," etc. Treadle-operated rear doors are being installed on a number of cars as they go through the shops for overhauling.













Furnishing Transportation in Texas Cities

1. New municipal auditorium in San Antonio opened on April 19. This is one of the outstanding developments showing the progress of this city during the year.
2. Street scene looking north on Congress Street in Austin. This 100-ft. street allows ample room for street car movements and enables this company to maintain a high schedule speed.
3. Houston's bus garaging facilities in the rear of the carhouse. Each berth will accommodate two buses.
4. Looking south on Main Street, Houston. Street car service was abandoned on this street to give way to vehicular traffic and the cars are now operated on adjoining streets, where vehicular traffic is not as heavy.
5. On the route of the River Oaks bus line in Houston is found this sign, which is self-explanatory. The bus is a recognized means of transportation to this community.
6. After two hours rain in San Antonio, the streets often become flooded, as shown in this picture. The re-establishment of car and bus service was greatly aided by the extensive telephone dispatching service used on this property. The auto to the left is stalled, the one to the right will be!
7. One of the River Oaks subsidized express buses ready to leave a downtown terminal in Houston.
8. Carhouse and storage yards of Houston Electric Company.





Such cars are painted in different color combinations, it being desired to provide a change and to attract more attention. A further description of "Houston's talking cars" will be given in an article in ELECTRIC RAILWAY JOURNAL by F. J. Bennett, master mechanic for the Houston Electric Company.

MAINTAINS SERVICE BY TELEPHONE DISPATCHING

San Antonio has used a telephone dispatching service to maintain the cars on time. W. H. Holden believes that this system not only makes the service more flexible but is an economy that pays the cost of the telephone equipment and then some. Fewer inspectors are required and more efficient service is maintained. All operators call the dispatcher at the end of each line just before their scheduled leaving time. Other telephones are installed at intermediate points, there being 46 stations in all.

In addition to this system twelve inspectors are used to operate the eighteen car lines and the seven bus routes, requiring in daily operation 130 cars and 24 buses.

An example of the use of telephone dispatching was afforded on April 20. A severe rainstorm took place, 3½ in. of rain falling in two hours. Practically all car and bus lines were blocked by temporary floods for from 30 minutes to two hours. Several cars and buses went dead due to water-soaked equipment.

Despite this severe condition service was established on all but two lines in about two to three hours. On these two lines more serious trouble developed that required track or bridge repairs. Connecting service, however, was established until these lines could be repaired. Due to the telephone dispatching, lines could be placed first on long headways and then more frequent, as equipment became available.

In addition to this reliability feature, considered essential by Mr. Holden, the service is studied and schedules are changed as traffic checks indicate necessity. Cars are being repainted frequently and in many cases a blue lone star, the emblem of the state of Texas, is painted on the outside.

The work of the traffic study and control through

Northern Texas Traction Company
WELCOME LEGIONNAIRES

This ticket, if presented at any time on
SEPTEMBER 1, 2, 3 OR 4, 1925
will be accepted in payment of one fare on the CITY CARS only of this company.

NOT GOOD IF DETACHED

The "Information" Trainmen of the Northern Texas Traction Company will be glad to direct you to any part of the city.

These tickets are issued complimentary by the General Convention Committee of Bothwell Kane Post No. 21, Fort Worth, for the Seventh Annual Convention of the American Legion, Department of Texas.

Reproduction of One Ticket from a Book Distributed to the American Legion in Conjunction with the Northern Texas Traction Company of Fort Worth. The Book Contained Ten Such Tickets, and When Used Was Paid for by the American Legion. Nearly $1,500 Worth Were Sold During the Four Days of the Convention. This Plan Was Explained in an Article that Appeared in the May 22 Issue of This Paper







1. At the entrance to the turning basin of Houston's ship channel are large docks and elevators, as shown in this picture.
2. Houston's docks extend for some distance down the entrance of the ship channel.
3. Looking across the turning basin at the Houston end of the ship channel. Ocean-going craft can load and unload at extensive docks. It is this ship channel that has caused much of Houston's recent growth.

engineering records has continued under the direction of W. R. Castle, transportation engineer. The work and methods used were told in the ELECTRIC RAILWAY JOURNAL of July 25, 1925, page 121. Service is budgeted in advance and schedules are built to provide this service. Careful checks are made continuously and changes are made in schedules wherever conditions warrant.

Schedules have been speeded up. Based on careful studies, the schedules between time points have been shortened to avoid slow running. Cars are given definite time points inbound from the end of the line to the city center, but are than allowed to proceed as fast as possible on the outbound trip to the end of the line, as few people are picked up on the outside of the city center on the outward trip.

Congress Street, Austin, being 100 ft. wide, has ample room for parking on the side and generally allows a clear track for the cars, so that a relatively high schedule speed is maintained.

The Austin Street Railway contemplates establishment of bus service to new developments, but to date all service is given by cars, most of which are the lightweight single-truck one-man type.

Many companies are planning to enter the contest for the 1926 Coffin Prize. Some companies have this work well under way. Based on the experience of three years past some excellent presentations are expected.

Railway Doing Well in Augusta

One-Man Cars Used Exclusively on City Lines—Improved Rolling Stock Has Brought Lower Costs —No Increase in Competition from Private Automobiles Expected

LIKE many other cities in the South, Augusta, Ga., is attracting each year more residents, both permanent and temporary. Owing to its altitude, dry climate and equable temperature, Augusta and its neighboring city in South Carolina, Aiken, have always been favorite resorts during the winter for many persons of means and leisure who wish to escape the rigors of a Northern winter. While the number of this class of residents is increasing, Augusta has also participated in the industrial activity and growth which recently has followed a better recognition of the advantages possessed by the South for manufacturing purposes. These advantages include a lower cost of labor because of cheaper living conditions, low cost of power because of the many hydro-electric developments and freedom from transportation delays because of practical absence of snow. To these, in some instances, may be added proximity to the source of raw materials, as in the case of cotton mills and manufactures requiring the use of lumber and steel.

All of these conditions have helped the traction properties of the South. As opposed to them have been the increasing number of private automobiles and a climate which permits their use without difficulty for twelve months during the year.

Augusta suffers from this latter cause. Its main street is wide enough to permit two trolley tracks in the center, a line of parked automobiles on each side of the double track, at least two lines of moving vehicles on each side of these parked automobiles and, next to the curb, still another line of parked automobiles. There are, it is true, regulations limiting the period of parking, both against the reservation in the center of the street and along the curb line at the side, but if an automobile leaves its place before the end of its parking period, another is pretty sure promptly to take its place. Of course, the loss of traffic which has come from the competition with private automobiles has a theoretical maximum which now must have been nearly reached, because of the difficulty which the average driver finds in locating a parking place.

The principal transportation improvements on the Augusta system by the Augusta-Aiken Railway & Elec-



The Principal Street in Augusta Is Wide Enough for Two Tracks in the Center, a Row of Automobiles on Each Side of These Tracks, a Roadway Outside of These Parked Automobiles and a Row of Parked Automobiles Along the Curb



The Space Outside the Tracks Is Used for Parking Except at the Island Platforms

tric Corporation during the past few years are new cars, the addition by the city of several island platforms for waiting passengers and the construction of a dispatcher's office and information booth between the tracks at a central point in the downtown section. A representative of the company is stationed at this booth from 7:10 a.m. to 9:47 p.m. His duties are to make change and supply tokens to conductors, check schedules, issue orders to trainmen, etc. He is connected with other points on the system by telephone. All cars of the company, both city and interurban, pass this point.

The company uses 32 cars in its normal service. Fifteen of these are of the single-truck Birney type. Ten are double-truck safety cars made over from two-man cars and seven are used for the interurban division of the company. Of these seven cars, five are used for through business and have two-man crews. The others, which do only a local business for about 5 miles out from Augusta, are one-man cars.

TABLE I—OPERATING EXPENSES PRINCIPALLY AFFECTED BY CAR MODERNIZATION, CENTS PER CAR-MILE

	1923	1924	1925
Power	1.12	0.84	2.07
Conducting transportation	10.92	8.74	8.68
Maintenance of equipment*	3.6	3.1	2.8

* Exclusive of depreciation.



This Dispatcher's and Information Booth Is on an Island Platform near the Center of the City

TABLE II—MAINTENANCE OF EQUIPMENT, EXCLUSIVE OF DEPRECIATION, CENTS PER CAR-MILE
(Including accounts 29 to 38 inclusive)

	1921	1922	1923	1924	1925
City	4.9	3.9	3.9	3.1	2.7
Interurban	6.6	4.6	3.05	3.3	3.3
Average	5.6	4.1	3.6	3.1	2.8

The company's modernizing program for rolling stock during the last four years has brought material savings in operation, as the accompanying tables show. The first table gives the expenses for power, conducting transportation and maintenance of equipment, on the car-mile basis, for the past three years. The high cost for power in 1925 is due to the use of steam power during a long drought which occurred last summer. Table II gives data on equipment maintenance expenses.

As yet the company has put in service only one bus. It was supplied by the Yellow Truck & Coach Manufacturing Company and operates on the interurban route between Augusta and Aiken. In view of the large variety of fares charged on this line, the company has put in a National cash register for registering the fares.

The Readers' Forum

Cost of C., M. & P. S. Electrification Was $22,000,000

CHICAGO, MILWAUKEE & ST. PAUL RAILWAY
Legal Department

CHICAGO, May 11, 1926.

To the Editor:

Today my attention has been called to erroneous matter contained in an article published in your issue of the 24th ult. under the caption "John D. Ryan offers intimate information."

The article, in dealing with the cost of electrification of the Chicago, Milwaukee & Puget Sound, states the cost of that electrification to have been $200,000,000, whereas the fact is the aggregate cost was slightly over $22,000,000. The third paragraph of the same article contains another error in figures in that the article states that the copper purchased by the railway company from the Anaconda company was worth $5,500,000. The fact is that the cost to the railway company of that copper was $3,900,000.

Your journal is read by persons who are technical and critical. The railroad management is at present being criticised, largely because of misinformation. As the representative of the Chicago, Milwaukee & St. Paul Railway, in charge of the proceedings involved in the Interstate Commerce Commission's investigation of why the road went into receivership, I am very much concerned in correcting misinformation and misleading statements. I am, therefore, bringing the foregoing to your attention in the confident belief that you will agree that in justice to your journal, to its readers and to the Chicago, Milwaukee & St. Paul Railway a correction of the April 24 article should be published in an early issue.

O. W. DYNES,
General Solicitor.

Maintenance Notes

Temporary Lighting Stands

IN RECONSTRUCTION work for electric railway operation it sometimes becomes necessary to provide temporary lighting of the streets due to disturbing the permanently installed lighting system. Such a condition exists along Eighth Avenue, New York City, where new subway construction is taking place. The permanent lighting fixtures have been removed and in their place have been substituted temporary lighting stands of the type shown in the accompanying illustration. These consist of a heavy base support with an upright constructed of 1-in. pipe. This is bent in a loop at the top and the lighting fixture is hung from this. The base is constructed of sheet steel and is 3 ft. square at the bottom. This tapers to an octagonal shape at the top which is about 12 in. across. The height of the base is 4 ft. In order to provide a solid anchorage for the upright pipe, the top is filled in with concrete. This is easy to install and sets quickly.

The lighting connections are carried outside the base connection being made to the original lines. The junction box of sheet steel is installed on the upright 18 in. above the top of the base. This type of construction forms a cheaply constructed as well as a neat appearing arrangement which can be moved readily when work in the immediate vicinity is taking place.



Temporary Lighting Stand in Front of the Post Office on Eighth Avenue, New York City



The Base, Constructed of Sheet Steel, Is Square at the Bottom and Octagonal at the Top

Pneumatic Tires on Acetylene Welding Truck

IN WHEELING acetylene welding outfits about the shops of the Department of Street Railways, Detroit, Mich., it was found that the gages and welding equipment got out of adjustment due to the vibration when passing over rough flooring and tracks. To remedy this condition, the welding trucks of the railway are now all provided with pneumatic-tired wheels. The cheapest and most satisfactory construction is to use standard Ford front wheels. Old tires from the company's automotive equipment are used.



Pneumatic-Tired Welding Truck in Use in the Shops of the Department of Street Railways, Detroit, Mich.

The framework for the truck is made of ¾-in. pipe. This is bent outward at the top to form handles. A bottom step of ⅛-in. sheet steel is provided, on which the tanks are mounted. On the other side, a box of sheet steel is built into the construction, in which small welding equipment is carried, together with welding wire, etc.

Armature Failures Eliminated by Baking

NO MEAN record was established by the Beaver Valley Traction Company, New Brighton, Pa., when the entire winter of 1925-26 was passed without experiencing a single armature or field failure. This freedom from breakdowns was accomplished largely through the use of a bakeoven designed by H. J. Meyer, master mechanic, and equipped with Westinghouse heating units and automatic electric control.

Field coils are first placed in the oven and subjected to a drying out heat for a period of from eight to



This Baking Oven Has Proved a Desirable Accessory to the Equipment of the Beaver Valley Traction Company

ten hours. They are then dipped and returned to the oven for the final baking. The latter process also requires from eight to ten hours, so that the preparation of the units extends over a period of approximately 24 hours. Thermostatic control maintains the baking temperature of the oven at 230 deg. F. Five heating units are provided, three at one end of the oven and two at the opposite end.

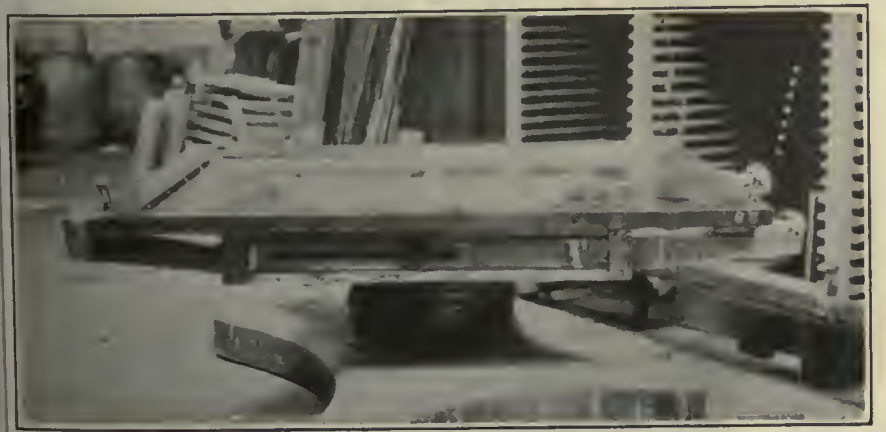
The oven is constructed of brick and access is through an opening with a sheet steel door. This door is arranged to raise and is counterbalanced so that its position may be maintained at any height desirable. Electric equipment for baking or drying is wheeled into the oven on a four-wheeled truck. The accompanying illustration shows some field coils in position for baking.

Turntable Speeds Sash Painting

CONSIDERABLE reduction in the time necessary for painting car sash has been made possible in the shops of the Grand Rapids Railway, Grand Rapids, Mich., by use of a small turntable on which the sash is placed for painting. The base for the turntable consists of a wood block 2 in. thick. On top of this two round blocks, each of 8 in. diameter by 2 in. thick, serve as swiveling bearings. A round rod in the center acts as a shaft and the top framework can be lifted off for convenient handling.

The top consists of a central wooden frame about 18 in. square. This has side extensions which when closed are 33 in. over all and which can be pulled out to 48 in. over all. They are clamped in any desired position by wing nuts. Rubber spools form the support for the sash during painting. These are 1 in. diameter by ½ in. thick. There are six of these on the center block and four additional spools on the extensions, one at the end of each arm.

A large number of different sized sash can be accommodated by this arrangement. The glass part of the sash rests on the spools during painting, so the entire frame is not touched. By rotating the frame the workman does not have to reach across the sash.



Convenient Turntable Fixture Reduces Labor of Painting Sash in Grand Rapids

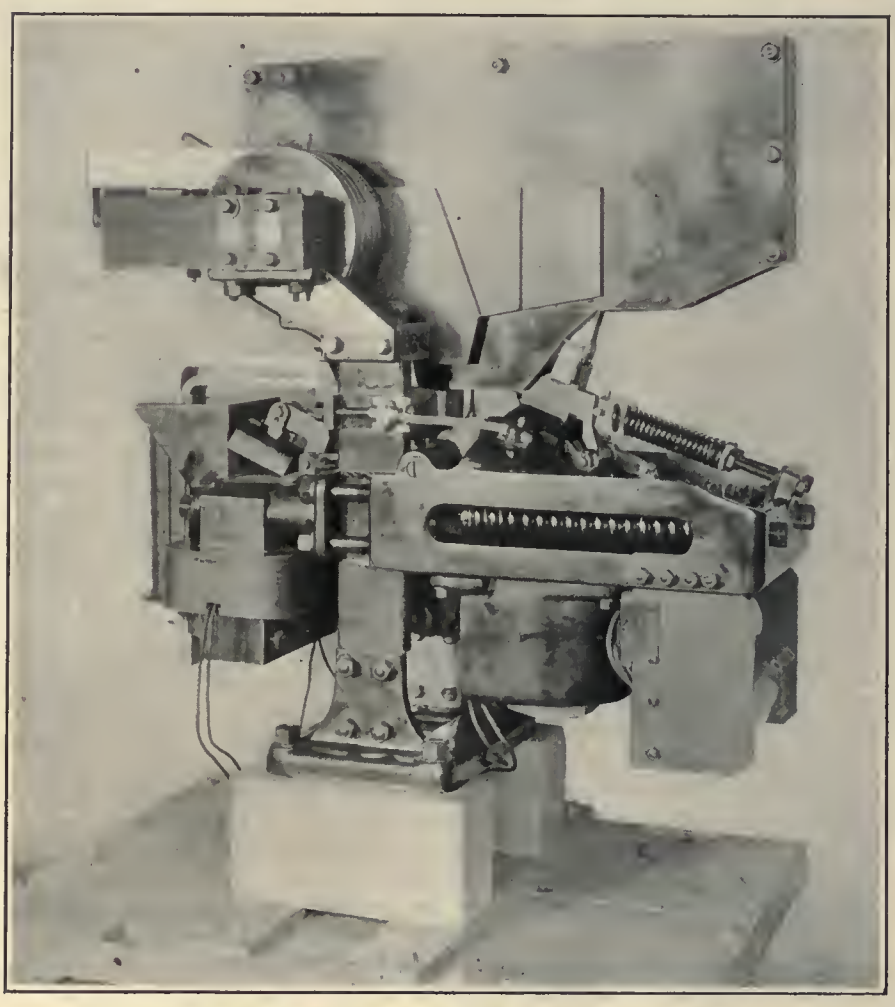
New Equipment Available

Improved High-Speed Circuit Breaker

DIFFERENTIATION between legitimate overloads and short circuits by automatic means requires many important details in circuit breaker design. The new type high-speed circuit breaker of the Westinghouse Electric & Manufacturing Company is an air-break switch of the contactor type without auxiliary arcing tips. The breaker has a movable contact of solid copper bridging two stationary contacts. The movable contacts are held closed by the action of an electromagnet. Inside the breaker structure the path of the line current is divided into two parallel circuits. One is stacked with iron punchings to form an inductive circuit, while the second is non-inductive and is passed through the magnetic circuit of the breaker's "holding-in" coil, in such a manner that the flux due to load current bucks the flux of the holding magnet.

Under normal load conditions the holding coil flux predominates and the breaker is held closed against the action of strong springs and the currents in the two parallel paths vary inversely as the resistance of the paths. Under short-circuit conditions, one path being inductive, the current divides in the parallel paths inversely as their impedances. Therefore, the non-inductive path through the holding coil field will carry a much larger proportion of the short-circuit current and the holding coil flux will be bucked down, allowing the breaker to open instantly by the action of the opening springs held in tension by the holding magnet. A powerful magnetic blowout and an arc chute of ample size serve to lengthen the arc incident to the interruption of the circuit to a point of instability at such a high rate of speed as to dissipate it in a very short time. Under conditions of steady load or slowly changing load the inductive shunt has little or no effect on the current which divides between the two paths in the inverse ratio of their resistances.

The breaker is held in the closed position against the action of strong springs by the holding-in armature sealing to the holding-in magnetic circuit. To open the breaker the flux of the holding coil must be bucked down to such a value that the seal will be broken by the action of the opening springs. It is apparent that for given values of shunt resistance, bucking-bar resistance and flux of the holding-in coil, there is a certain value of excessive overload current that will buck down the holding-in coil flux and open the breaker. It is also evident that this value of overload current required to open the breaker will decrease in magnitude as the voltage on the holding-in coil is decreased. Due to its inherent de-



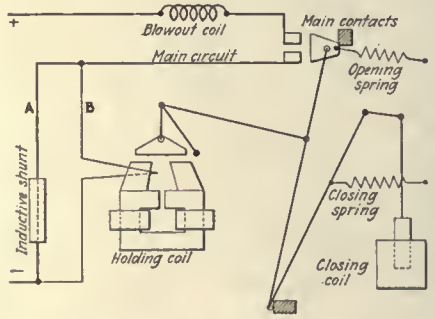
Type HS 300-Amp., 1,500-Volt, High-Speed Circuit Breaker

sign characteristics the high-speed breaker will open on short circuits and excessive overloads.

The division of current between the bucking-bar and shunt, the holding coil flux and the inductance of the shunt circuit is so proportioned that the breaker will not open at overloads within the capacity of the machine. The features of the automatic switching equipment are so designed that load-limiting resistance is inserted in the machine circuit with overloads to limit the output of the machine to within its rated capacity. Therefore, the slowly rising overloads are automatically limited before they reach a value great enough to open the breaker.

High-speed breakers are designed essentially for machine protection and should be connected in the machine circuit with its holding-in coil excited from the machine voltage. Under operating conditions the breaker will be supplied with normal voltage, thus making it possible accurately to adjust the tripping mechanism so that the breaker will differentiate between short circuits and legitimate overloads, opening only on short circuits.

When high-speed breakers are used in feeder service it is necessary to excite their holding-in coils from the station bus unless an expensive storage battery or motor-generator set is supplied for that purpose. Under such conditions the breaker is operating with an impressed voltage on its holding-in coil that may vary as much as 100 to 150 volts as the load-shifting resistances are cut in to lower the bus voltage and transfer a portion of an overload to adjacent stations. If the breaker is calibrated to select between legitimate overloads and short circuits with normal bus voltage impressed upon its holding-in coil, it is evident that the breaker will open on heavy overloads when the bus potential has been reduced appreciably by the insertion of the load-limiting resistance, thus interrupting the circuit when it is most important that the feeder breaker should remain closed.



Diagrammatic Sketch of High-Speed Circuit Breaker Connections

Tilting Frame for Motor-Driven Saw

WITH the driving motor and saw blade mounted at opposite ends of a tilting frame, a high-speed circular metal cutting saw has been designed by the Hunter Saw & Machine Company, Pittsburgh, Pa. A double-jaw, quick-acting, eccentric vise is used to hold the material firmly during the cutting operation. The table of the machine is provided with a quadrant stop that can be set to any angle within the sweep of the saw blade. A pan is attached to the under side of the table to catch cuttings and so aids in keeping the shop in neat condition.



High-Speed Metal Cut-Off Saw

Adequate protection to the operator is provided by means of steel guards that cover both the belt and saw.

The machine is driven from a Westinghouse Electric & Manufacturing Company's motor, through an endless belt. A push-button-controlled magnetic starter is used for the control of the motor. Proper alignment of the pulleys is obtained by having the motor keyed to the base, the handwheel providing for convenient belt adjustment. The low belt tension which is a particular feature is provided through a wide belt.

Association News & Discussions

Dimensions for Carbon Brushes and Shunts Listed

SIMPLIFIED lists of sizes and dimensions for carbon brushes and brush shunts were established by the division of simplified practice of the Department of Commerce at a meeting held in Washington on April 14, 1926. This conference included representatives of manufacturers, distributors and users of carbon brushes and brush shunts, and was held at the request of the Electric Power Club in an endeavor to determine reasonable size limits within which one dimension might vary in respect to another fixed dimension.

It was the sense of the conference that a standing joint committee be organized which will include representatives of all elements of the industry and whose function will be to observe the adequacy of the recommendations now adopted through the first active year. The first concern will be to give further study to many important suggestions that were developed at the meeting. The standing committee will consist of two representatives of brush manufacturers, two representatives of the motor and generator manufacturers, two representatives of the retailers and two representatives of the users.

It was the opinion of the conference that close co-operation between the manufacturers of carbon brushes and the fabricators of brush holders will prove advantageous to both groups, with the result that further simplification will appear desirable and practicable at some future time. The conference also felt that engineers, designers, purchasing agents, superintendents and standardization bodies, who are in any way concerned with carbon brushes and brush shunts, will derive tangible benefits from a simplified list of sizes. Such practice should decrease stocks, production costs, selling expenses, misunderstandings, etc. The American Electric Railway Association was represented at this conference by R. H. Dalgleish, chief engineer Capital Traction Company, Washington, D. C.

COMING MEETINGS OF *Electric Railway and Allied Associations*

June 2-4—Canadian Electric Railway Association, annual convention, Quebec, Canada.

June 9-16—American Railway Association, Mechanical Division, annual convention, Atlantic City, N. J. Car matters, June 9-11; locomotive matters, June 14-16.

June 10-11—Advisory Council conference electric railway executives, Eastern region, starting 3 p.m. June 10, Engineering Societies Building, 29 West 39th Street, New York City.

June 21-25—American Society for Testing Materials, annual meeting, Haddon Hall, Atlantic City, N. J.

June 25-26—New York Electric Railway Association, annual meeting, Hotel Champlain, Bluff Point, N. Y.

June 28-July 2—Central Electric Railway Association, summer meeting, S. S. South American, Buffalo, N. Y., to Chicago, Ill.

July 8-10—Midwest Electric Railway Association, annual convention, Brown Palace Hotel, Denver, Colo.

August 12-13—Wisconsin Public Utility Association, Railway Section, La Crosse, Wis.

Oct. 4-8—American Electric Railway Association, annual convention and exhibits, Public Auditorium, Cleveland, Ohio.

Creosoted Pine Poles*

By H. E. Braunig
Superintendent of Transmission and Distribution Eastern Texas Electric Company
Beaumont, Tex.

STRENGTH tests on wooden poles were conducted by the American Telephone & Telegraph Company in 1924 and by the United States Forest Products Laboratory in 1923. Each of these authorities found that pine is the strongest of the pole woods. Bulletin 556 of the Department of Agriculture lists it as 44 per cent greater in strength than the next strongest species, and this comparison was verified by the work of the Forest Products Laboratory.

In line construction, practical advantage is taken of the increased strength of pine, either by using smaller poles or by using longer spans. Three years ago our company adopted pine exclusively and in general we now use all poles 1 in. less in top diameter than formerly when other species were used. Pine maintains its strength over a long period. Tests made during the last eighteen months on creosoted pine poles 27 years old show that there was no decrease in strength.

The life of creosoted pine poles has been variously estimated at from 25 to 40 years. The Pennsylvania Electric Association's report in 1923 gives the anticipated life as 35 years. A recent paper by the Carolina Light & Power Company gives a life of 40 years. One of our oldest lines between Port Arthur and Beaumont was built in 1912. In its construction 652 poles were used. To date, three of them have been replaced due to decay, caused, so far as can be determined, from abrasions. Practically no decay has occurred at the ground line or top. Another line between Dallas and Sherman, Tex., was built in 1909 and contained 2,400 poles, none of which has been replaced. There is no doubt that the present-day application of the treating process is much better regulated and more scientifically handled than with these older pole lines. It therefore seems safe to assume that the treated pole itself is an even better product than we have hitherto obtained.

The conductivity of the wood is not increased by creosoting, and due to deep penetration of creosote it is a toxic to white ants. Impregnation by the full cell process with coal tar creosote renders wood resistant for at least 25 years.

Creosoted wood when new is more readily inflammable than untreated wood, but when it becomes older it is less inflammable.

*Abstract of a paper presented at the sixth annual convention of the Southwestern Geographic Division of the National Electric Light Association, Galveston, Tex., April 15, 1926.



Trolley Line of the Port Arthur Traction Company with Creosoted Pine Pole Construction Installed in 1911 Has Had No Replacements to Date

Birney Club to Discuss Obsolescence

"WHAT Constitutes Obsolescence in Street Cars" will be the subject of a paper by W. J. Mackle, superintendent American Car Company. This will be presented at the next meeting of the Birney Club, to be held in St. Louis at 6:30 p.m. on June 7.

The News of the Industry

Rapid Transit for Seattle

Committee of Laymen Sees in Rapid Transit System a Cheap Solution for Present Difficulties

One hundred and six pages of typewritten text and a dozen pages of artist's sketches are used by the rapid transit committee of Seattle, Wash., to tell why that city needs rapid transit. The report is summarized in twelve findings and two recommendations abstracted herewith. The report is signed by William Pitt Trimble as chairman of the committee of five citizens.

According to the committee the "street car business" in Seattle is falling off at the rate of about 1,000,000 passengers yearly, notwithstanding that the population during the last fifteen years has more than doubled.

The members say that the multiplication of street traffic during the last fifteen years in the downtown sections of Seattle and other cities of this class has demonstrated the impracticability of surface cars providing cheap and quick transportation in competition with the automobile. In the six years from 1919 to 1924 the number of trolley car passengers across the drawbridge fell off 21 per cent, while the number of automobile passengers gained 181 per cent. During the same period, in cities supplied with rapid transit lines, the business has increased faster than the population. Says the committee:

> Trolley car service is too slow. The rapidly moving "jitney bus," with its miserable accommodations, took so many thousands of passengers from the trolley cars that jitney competition had to be suppressed by law, but this legal suppression of public competition had only a temporary effect upon the decline in trolley car business.

According to the board, the experiment in 1923 of lowering fares immediately added 12 per cent to the number of passengers, but a 5-cent fare cannot be maintained, because trolley cars cannot be operated for much or any less than the present fares. Still, says the board, the fares are too high. It believes that buses will not remedy the situation, for with "their limited carrying capacity it would take so many more of them than trolley cars to do the business that they would add to the situation instead of relieving it."

With the innumerable crossings, necessary and unnecessary stops, cross-traffic and other interferences, buses cannot make the required time through crowded areas, nor expeditiously and economically move large masses of people. That is the committee's opinion. In consequence "a rapid transit system is the only solution and is necessary" to meet the demand for quicker, cheaper, more regular and more comfortable service than can be given by either the trolley car or the automobile.

It submits its plan as the only practicable solution of the local problem. In this connection it finds:

That the system can be built for less than $4,000,000.

That the gain in business and the saving of time in operating costs would be enough to pay the interest, etc., upon the cost of construction.

That it will be a great saving of money and time to the traveling public, amounting to about 6,000,000 hours annually, and this, estimated at the nominal value of 10 cents an hour, is an unnecessary tax upon the street car users of $600,000 a year, which loss can be saved by the proposed rapid transit system.

That the first unit would serve about 40 per cent of the population and would have to add only 2 per cent to the value of this 40 per cent of the assessed value of the city to pay for itself in one year.

That the information broadcasted that Seattle was the smallest city in the country and the first city west of Chicago to have rapid transit would be of tremendous advertising value to the city.

That it is the city's duty to see that the people have cheap, quick and comfortable transportation facilities.

That the longer the construction of the system is delayed the greater the loss of business, the cost of construction and the difficulty of financing.

For these reasons, or, as the committee prefers to say, "now, therefore, your committee recommends as follows":

1. That the city itself should at once proceed to provide proper facilities, or

2. That it should go out of the business and grant such a franchise to a private company, so that such company could furnish more rapid, regular, frequent and cheaper service and facilities to the traveling public; otherwise, the only way the surface roads can ultimately escape the bankruptcy court is by placing this unnecessary burden upon the already overburdened taxpayers and without any benefit to the railway department or to its patrons, or to the credit of the city.

Bus Company Contracts to Buy Railway

Fifth Avenue Coach Company Plans to Take Over 74 Miles of Surface Lines, Renews Its Plea for Bus Rights and Offers to Install Five-Cent Zone System

TWO major and several minor moves have been made involving the affairs of the New York Railways, operating 74 miles of surface lines in the Borough of Manhattan. First, the Fifth Avenue Coach Company has contracted to buy the railway. Second, control of the Fifth Avenue Coach Company, which operates the Fifth Avenue bus system, has passed from a group of Chicago capitalists to a group of New Yorkers. Third, bondholders of the New York Railways have voiced opposition to the plan advanced for the amortization of the bonded indebtedness of the railway under the plan advanced for the substitution of buses for parts of the railway system which it is deemed advantageous to supplant. Fourth, the railway made a bid to operate buses on a 5-cent zone basis. The third of these developments is the outgrowth of the others.

Announcement of agreement to purchase the control of the New York Railways Corporation by the Fifth Avenue Coach Company was made on May 23 by Hugh J. Sheeran, president of the former company. In his statement Mr. Sheeran repeated the willingness of the surface car company to surrender the perpetual franchises to some of its lines for a bus franchise and to tear up its tracks on certain streets and avenues and to substitute buses.

It appears that on May 19 the board of directors of the Fifth Avenue Coach Company, subject to the approval of the Transit Commission, ratified the agreement for the purchase of the common stock of the New York Railways. This marked the first important step in a new policy due to the passing of control of the Fifth Avenue Company from the Chicago group, which acquired it nearly two years ago, to various New York men.

These interests are represented, among others, by David A. Schulte, W. A. Harriman & Company, J. & W. Seligman, Grayson M.-P. Murphy, Charles H. Sabin of the Guaranty Trust Company, Elmer Schlesinger of Chadbourne, Stanchfield & Levy, Harry Bronner and John A. Ritchie, president of the Yellow Truck & Coach Manufacturing Company. These interests are now in control of the Omnibus Corporation, which owns the New York Transportation Company, which in turn owns all the stock of the Fifth Avenue Coach Company.

Mr. Sheeran says that if the Transit Commission shall approve of the proposed purchase the initial step will have been completed in a plan which contemplates complete and fully modernized motor coach service for the island of Manhattan.

According to him, in developing such a plan, there are certain local problems peculiar to New York city which are both of a legal and an operating character. As is well known the principal north and south streets of Manhattan are for the most part already occupied by street car tracks which were laid and are now operated under the terms of perpetual franchises. So Mr. Sheeran points out no comprehensive bus system can be operated which does not involve the use of streets where railways are now operating.

The New York Railways has such franchises on Broadway, Sixth Avenue, Seventh Avenue, Columbus Avenue, Lexington Avenue and Lenox Avenue, as well as on Spring Street, Eighth Street, Fourteenth Street, 23d Street, 34th Street, 116th Street and other

streets. It, therefore, has franchises for street car operation on thoroughfares which would be indispensable to any comprehensive motor coach system.

Mr. Sheeran said:

> The New York Railways, by reason of its existing franchise rights, is in a peculiarly favorable position to co-operate with the city in extending and improving the city's motor coach service. It can promptly install an efficient service, operated by a thoroughly trained and expert transportation management and personnel. Its official and executive staff are expected to remain as at present.
>
> Since it is already equipped with buildings suitable for garage purposes, shops, etc., it will be in a position, because of the additional facilities at its disposal, to furnish the service in the shortest time possible, much of it at once and all of it within a period of, say, 120 days after getting a legal franchise. This applies to the lines laid out by the city authorities for Manhattan and for which the Manhattan Surface Coach Company has filed the necessary application.

In all of these proposed operations of the Manhattan Surface Coach Company the plan contemplates an arrangement by which the company will have the benefit of the experience and knowledge of the Fifth Avenue Coach Company and will receive active co-operation of the management of that company, which already has large manufacturing and maintenance shops in the city.

The plan of the Manhattan Surface Coach Company provides for a temporary service at once in the important territory of Manhattan lying west of Madison Avenue by making provision that until motor coach service can be operated in that section of the city, the motor coach lines of the Manhattan Surface Coach Company will transfer passengers to Sixth Avenue, Seventh Avenue or Broadway street car lines.

The company is prepared also, in the event the city authorities so desire, to enter into an agreement involving the substitution of motor coach operation for railway operation on Sixth and Seventh Avenues. In other words, as Mr. Sheeran has expressed it, "whatever plan would seem to the city authorities to be in the public interest, the New York Railways is prepared to co-operate in bringing it about."

As an evidence of the willingness on its part the company says it is ready at once to substitute motor coaches for street cars not only on Sixth and Seventh Avenues, but also on Columbus Avenue and on the Eighth and 116th Streets crosstown lines. Not only that, but Mr. Sheeran says that "if it be the desire of the city that all of the street car tracks in the New York Railways system shall be removed and the company be given the right to operate motor buses on these thoroughfares the New York Railways is ready to enter into negotiations to bring this about."

As the sponsors of the plan see it, the proposal provides for the inauguration of a comprehensive motor coach system without incurring vexatious and prolonged litigation which would necessarily arise were any attempt to be made to set up an omnibus service on the same streets where street car lines are now operating under conditions which do not give the owners of such property a fair return on their investment. According to them the plan would also mean the setting up of a complete and comprehensive system which the city could take over for municipal ownership and operation, if such a policy were at some future time determined to be wise.

Hardly had the ink dried on the papers that contained this statement than bondholders arose to ask, in effect, "What about us?" A spokesman for the Broadway & Seventh Avenue bondholders said that the proposal to substitute buses for street cars on Seventh Avenue had not been approved by these bondholders and that they were prepared to fight any such step. He asserted that bondholders' committees would be formed if they were not assured that what they considered their rights would be protected. The objection of the bondholders to the substitution of buses for street cars on Seventh Avenue is based on the belief that the motor vehicles would not prove as profitable on this thoroughfare as do street cars. They hold that for this reason it would be unwise to relinquish perpetual franchises in return for short-term bus franchises. There is a minority stock interest in the Broadway & Seventh Avenue Railroad which the bondholders claim will support them in opposition to the plan. The Broadway & Seventh Avenue bondholders also believe they will win support from Bleecker Street and Fulton Ferry 4 per cent bondholders and minority stockholders, Twenty-third Street Railway 5 per cent bondholders and minority stockholders and Thirty-fourth Street Railway 5 per cent bondholders. These properties in the New York Railways system have never defaulted on bond interest.

Counsel Promises Consideration for Bondholders

To this expression of concern Elmer Schlesinger, of counsel for the Fifth Avenue Coach Company, said that the matter of caring for bondholders has seemed a question so much of the future that "we have not given it much consideration." He said:

> I have not even looked into the terms of the mortgage on which the Broadway & Seventh Avenue Railway bonds were issued. We intend, of course, to meet all legitimate claims of bondholders.
>
> In previous plans for the substitution of buses for street car lines it was proposed to determine the actual value of the railway property and then to amortize bondholders' claims through payments extending over the suggested period of the bus franchises, which was for twenty-five years. This plan provided a means of discharging bond obligations without the need of a large initial cash payment.
>
> Abandonment of street car lines under the plan of the New York Railways Corporation would not take place immediately, even if the plan were to meet with official approval. If and when the time comes for satisfying the claims of bondholders they would likely be met on the basis of a fair valuation of the property involved rather than on the face value of the bonds.

As an alternative to its plan for bus and surface car operation the New York Railways has made a bid for operation of buses in Manhattan on a 5-cent fare, zone system basis, similar to one made by the Third Avenue Railway through its subsidiary.

The new proposal was disclosed by Mr. Schlesinger, who made the announcement in commenting on plans to block dismantling of surface lines outlined by a spokesman for Broadway & Seventh Avenue Railway bondholders.

As outlined by Mr. Schlesinger, the reasons for the submission of the 5-cent zone plan bid were substantially those described by S. W. Huff, president of the Surface Transportation Company. Both interests feel that a unified bus and street-car system operated on a 10-cent fare basis is most suitable for the needs of New York City, but that the zone system provides a method of establishing a 5-cent fare should this be considered indispensable.

Former Mayor John F. Hylan declared that it looked as though the machinery had been oiled to put over one part of the deal of which he talked during his last campaign. He also criticised Governor Smith for signing a bill to permit a bus company to buy the stock of a surface line company, and former Comptroller Charles L. Craig for activity in the transit situation.

Mayor Walker, in commenting upon his predecessor's statement, said:

> We are not trying to please one individual. The effort of this administration is to satisfy six and a half million people with proper transportation. Especially we are not trying to satisfy an individual who with eight years of opportunity did nothing.

As indicated previously, the New York Railways system now has approximately 74 miles of single track. The company carried 148,105,561 passengers last year. It has $37,432,472 in bonds outstanding and 184,830 shares of preferred and 90,200 shares of common stock.

Richmond Franchise Up to Mayor

The blanket traction franchise for the operation of the Virginia Electric & Power Company, Richmond, Va., is now up to Mayor J. Fulmer Bright. The Board of Aldermen, after brief discussion and explanations by Alderman Ordway Puller, chairman of the streets committee of the City Council, on May 25 adopted the paper without amendments. Alderman Joseph C. Nunnally sought to amend the section relating to an underground system for Broad Street, and Alderman Charles W. Moss desired to amend so that the traction company would be required to pave all streets from which tracks may be removed. Both amendments were lost, and then the paper was concurred in with but one dissenting vote, that of Alderman Nunnally.

The franchise provides for a 7-cent fare; the company to pave and repair between tracks and 2 ft. on either side; the company to pay 5 per cent of gross revenue as tax for the first year, this sum to diminish annually for ten years until it reached the low point of 3 per cent, to remain at that figure during the life of the franchise; the present owners to sell to the successful bidder for the franchise at a valuation of approximately $9,500,000; the city to take over, within a period of five years, the various viaducts free of cost; the elimination of duplicate lines, and extension of others, the extension of the Seventh Street tracks from Clay to Leigh Streets (one block), for possible extension of the interurban (Richmond and Petersburg) line to Seventh and Leigh Streets, as the terminal.

The concurrence in the paper by the Board of Aldermen, the Common Council previously having adopted the ordinance, is the culmination of long-drawn-out discussion. The franchise as finally agreed upon is considered by all concerned as a compromise. The streets committee conceded certain points and the traction company conceded many.

The result, it was shown, received the approval of every member of Common Council and eight members of the Board of Aldermen.

June 2 has been set as the date for consideration by the streets committee of the City Council of the new bus ordinance, under which the Virginia Electric & Power Company will operate its fleet of automobile passenger buses. General provisions of the measure have been agreed to, it is understood, and it is hoped to have it operative within a short time. The bus service will be operated in co-ordination with the electric car routes.

Traction Discussion Renewed in Chicago

Service at cost in the high point of the present deliberations of the committee on local transportation of the City Council of Chicago with regard to the drafting of a new traction and subway ordinance.

Believing that the scheme would encourage economic management of the surface and elevated lines, tentative approval has been given to a plan brought forward by Corporation Counsel Busch which would reduce the rate of return whenever fares are increased and increase the return when fares are decreased. In order to determine the cost of service, 2 per cent of the valuation of the surface lines properties, or approximately $3,200,000, would be set aside with the initiation of the plan. This fund, called a "barometer" or stabilization fund, would take care of all operating deficits. Should the fund fall below 1 per cent of the valuation, fares would be increased 1 cent automatically. Likewise, if the fund should reach 3 per cent of the valuation, fares would be automatically cut 1 cent.

The committee is definitely agreed that before new franchises can be granted to the surface and elevated lines, unification of service must be brought about. Because of the varying maturity of the outstanding traction securities, however, consolidation of ownership will not be demanded.

Before the committee adjourned on May 25 to await the appearance of representatives of the companies, approval was given to the recommendation of Major R. F. Kelker, the committee's engineer, that the surface lines be permitted to reduce the height of their rails from 9 in. to 7 in. In return for this privilege, which Major Kelker declared would result in large savings in construction costs, the surface lines would be required to pave their rights-of-way a width of 18 ft. instead of 16 ft. In addition, the committee concluded that eight-tenths of 1 per cent of the gross revenue of the companies should be set aside for payment into the amortization fund.

To control the operation of the traction lines under the projected ordinance, the committee has also indorsed the formation of a committee of five members, each of whom shall be appointed by the Mayor for a term of five years. Qualifications for membership, it was decided, shall provide only that the appointees be persons of business ability and public spirit and in no way connected with the traction companies.

General Strike Failed to Halt Service in Great Britain

Independent Bus Operators and Volunteer Railway Workers Provided Transportation Facilities Sufficient to Prevent Tie-Up During Recent Industrial Conflict



Independent Buses Operating in London During the Strike Were Overcrowded by Non-Striking Employees Anxious to Get to Work

TRANSPORTATION service throughout Great Britain was much impaired during the general strike, May 4 to May 11, but it never was completely halted. In London particularly, and to a lesser extent in other cities, the facilities provided by the independent bus operators were an important asset to the public in the first days of the strike. Volunteer drivers were quickly secured by the established bus undertakings, however, and extensive operations resumed before many days elapsed. Similarly, volunteer workers were instrumental in restoring service on the rapid transit lines and on the electric and steam railroads. Tramway service was hard hit, but the return of many trainmen eventually permitted the resumption of a considerable part of the service.

In the past there had been much talk about a general strike in England, but the call issued on May 4 by the executive council of the Trades Union Congress in support of the coal miners was the first actual attempt to carry out the threat. Both rail and road transport personnel were seriously affected. Other industries involved, besides that of coal mining, which was the underlying cause of the trouble, were iron and steel, building construction, printing, and to some extent engineering and electric power generation. The total number of workmen on strike was estimated between 3,000,000 and 4,000,000.

In fear that some such effort might be made, the government had prepared in advance and was ready with an organization for the transportation of food supplies by rail and road. Passenger transportation services had not been so thoroughly arranged and were seriously disrupted at first.

When transport stopped, the problem

of getting to and from work was much more serious in London for those not on strike than it was anywhere else in the country. This was because of the greater size of the city and the consequently greater distance between homes and places of employment. The main thoroughfares leading to the central business area were thronged morning and evening with hundreds of thousands of people going to and returning from work. The greatest number were on foot, but many had bicycles, and an astonishing number had motor cars. Never before had such multitudes of automobiles been seen in London streets.

The large Chelsea power station of the Underground railways was shut down and the whole system became dead. In a few days, however, sufficient men were found to start up the station again, and limited services were running on several of the tube lines. The London tramway and bus services were completely closed except for the independent bus operators who continued to run despite threats from strikers. The London General Omnibus Company got some buses on the street by the end of the week and some of the suburban tramway authorities began to run cars. Riots and sabotage were threatened when the London County Council attempted to operate its cars..

By Monday, May 10, a week after the strike began, a marked improvement had occurred in the means of passenger transport in London. There was no general breakaway of strikers, but the Underground railway companies and the London General Omnibus Company had been busy training volunteers to be drivers and conductors of trains and buses, and others for the duties of operating the Chelsea power station. In the last-mentioned work many engineering college students were quickly able to render valuable assistance. There were several hundreds of L. G. O. buses on the streets and the number of independents had also increased over the previous week.

Many special constables were recruited for whole-time work with pay, a large proportion of whom were employed for the protection of tramcars and buses from interference by strikers. In many instances a policeman or special constable sat beside the driver, but



A Group of Cheerful Volunteer Bus Operators Recruited by the London General Omnibus Company

cases of malicious interference were not numerous. The underground railways returned to something like normal services for a large part of the day. The London County Council Tramways, however, showed little signs of revival, as earlier attempts to bring out the cars had resulted in broken windows. Considerable rioting took place at Glasgow, Hull and some other industrial centers. In all districts where prosecutions took place for interfering with traffic or rioting the magistrates inflicted severe sentences of imprisonment.

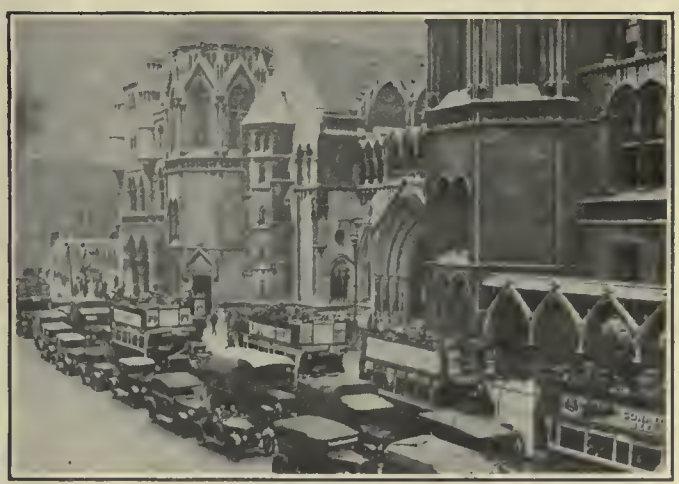
The suburban electrified lines of the large steam railroads also got to work and, so far as electric railways and buses were concerned, the London travelers' troubles were sensibly diminished. Elsewhere tramway and bus service began gradually to be restored.

On Tuesday, May 11, bus service in London was still further increased. The London General Company for the time being dropped graded fares and displayed on its buses the notice "Fare 3d. for any distance." The County Council tramway system remained dead, but in the provincial cities many tramway and bus employees returned to work. Normal services were practically restored in Portsmouth, Bristol, Newport, Cardiff and other towns, largely on account of the return of men, but to some extent also through the agency of volunteers. In various towns warnings were issued to tramway employees that if they did not return to duty by an early date they would be discharged. Of even more importance in inducing the men to return, however, was an official announcement signed by the Prime Minister declaring that every man who did his duty by the country and remained at work or returned to work during the crisis would be protected by the government from loss of trade union benefits, superannuation allowances, or pensions. The government would take whatever steps were necessary, it was said, whether Parliamentary or otherwise, to accomplish this purpose.

On May 12 the strike was called off by the Trades Union Council and two days later terms were arranged for the return to work of the employees of the London underground railways, the London tramways and the London General Omnibus Company and its associates. At first there were rumors that men were only to be taken back at reduced wages, but these proved without foundation. It was announced, however, that the employers made stipulations similar to those made by the steam railway companies, that the men would be taken back as soon as traffic warranted and work could be found for



More Motor Cars Were Seen in London Streets During the Strike than Ever Before. This Shows Victoria Embankment Looking from Waterloo Bridge at 10:30 A.M.



After a Few Days the London General Omnibus Company Was Able to Resume Partial Operation. Traffic Passing in Front of the Law Courts During the Morning Rush

them. It was also arranged that volunteers who had helped the services in their emergency would continue to be employed should they so desire.

The electric railways, both underground and suburban, did not get back quite to full services at the week-end, but on the 15th something like normal traffic was restored. The London County Council tramways, resumed operation on some routes on the afternoon of the 14th, and on the following day were coping with public demands.

Elsewhere in England and in Scotland in a number of large towns where a certain proportion of tramcars and buses had been running during the strike communications were rapidly improving. In other places there were local disputes as to terms of reinstatement, and a condition that only non-union men would be employed was spoken of. Everywhere, however, there was every prospect of normal work being speedily resumed.

During the strike the order issued some time ago under the London traffic act reducing the number of bus trips on certain routes was not enforced. Although intimidated by the strikers, the so-called pirate buses continued running, and thereby earned the gratitude of the public. It is thought that this may stand them in good stead when the restriction question comes up again.

Enabling Act Passed in Massachusetts

Governor Alvin Fuller of Massachusetts on May 26 signed the bill which will enable the New York, New Haven & Hartford Railroad to acquire and hold the securities and properties of the New England Investment & Securities Company, the Springfield Railways, the Springfield Street Railway, and the Worcester Consolidated Street Railway. The amendment proposed by the Governor when he returned the bill to the Legislature was compromised and rewritten to provide that the act to become effective must be accepted by three-quarters of the cities served by the railway companies. The municipalities on the lines number 49.

Need for Changes in Louisville Grant Stated

The Louisville Railway, Louisville, Ky., published a page advertisement on May 22 in the Louisville *Herald-Post*, carrying a letter signed by President J. P. Barnes, addressed to Mayor A. A. Will. Mr. Barnes said the ad would be followed by a series of six letters which will be published in the newspapers, starting on May 24. He said:

You are already familiar with our situation regarding extensions to the transportation system of Louisville. A very considerable pressure has been brought upon us in many directions to make extensions, and we find ourselves unable to do so, because the investors in public utility securities are unwilling to advance money to the Louisville Railway for extensions, so long as the restrictive provisions of the present ordinance obtain.

Specifically, what the investor requires is a security equivalent to that which he finds in the offers of companies under federal regulation, or under the regulation of the 43 states which have public utility laws. All of these jurisdictions base rates for public utility services on a reasonable return on a fair value of the property devoted to the public use. This basis guards as effectively as anything can against the emergency conditions which might arise in an economic crisis like the one accompanying the World War, and to this extent the investor is in a position to demand, and he does demand, protection for his investment in public utility securities.

We feel that the modification of the railway company's ordinance in this sense would be of enormous benefit to the system in permitting us to command funds for needed extensions, and that the control over rates of fare which could and should be retained by the city, subject only to a reasonable return rule, would amply protect the public against extortionate fares. There is no present necessity for an increase in fare, nor do we see a prospect of such necessity. It is merely the unforeseen against which the investor demands protection.

We feel that the retarding of the city's growth through our inability to make transportation extensions is very considerable and of very great importance, and have therefore prepared a series of six letters, which will be published in the newspapers commencing next Monday. We have tried to state the situation concisely, correctly and convincingly.

We feel this matter to be charged with a public interest and concern so grave that we are making this preliminary letter to you open so that the public may not be uninformed as to any step of our program.

Strike in Akron Called Off

Former Employees Sue for Peace—Accept Individual Contracts and Return Under Old Working Conditions—Buses Commended—More Car Lines to Go

CARS are again running as usual on the city, suburban and interurban lines of the Northern Ohio Power & Light Company, Akron. The strike is over. It was called off on Saturday afternoon, May 22, at the suggestion of Amalgamated officials, and complete service was resumed Sunday, May 23.

The strikers who were acceptable to the company were taken back as individuals. They signed individual contracts and accepted seniority rights behind the men working Saturday, May 22, at the same pay and under the same working conditions that existed May 1, the date the strike was called.

When the strike was called off the company had established complete city service in Akron and Canton and interurban service between Akron and Massillon. Many men had also been employed for use on the Akron-Cleveland division and the Akron-Warren-Alliance lines commencing on May 24.

The strike was called off following a request on May 21 from W. K. Jones, an old employee, that the company state the terms upon which the striking employees acceptable to the company would be taken back. Jones was supplied with the information and then suggested a vote on the proposition. The vote showed a majority in favor of ending the strike and accepting the terms laid down by the company. Many new men have been hired since May 1, so the company is unable to use all of the former employees who are acceptable. They are re-employed on a basis of their past record.

As an aftermath of the strike four strikers are to be prosecuted on a federal charge of attempting to block United States mail. The men attempted to stop a Canton-Akron train carrying mail Thursday, May 20, near North Canton. Three other strikers are being sought on dynamite charges. All prosecutions will be pushed to the limit.

When the strike was ordered on May 2 by Edward McMorrow, vice-president of the Amalgamated Association, the organization "went to bat" against the most powerful bus system ever gathered together in a city of 200,000 and against public sentiment, as well as one-third of the Akron city employees who were not members of the union.

In five days Akron city service had been increased from the skeleton system in operation Sunday, May 2, to normal. The company then turned its attention to Canton, and in four days more had restored practical normal service there despite the laxity of cooperation on the part of the police department.

Tuesday of last week interurban service began to be restored and the climax of the strike followed shortly, with a series of dynamitings, minor riots in Canton and lesser disorders in Massillon, where no attempt was made by the police to protect trainmen who were working. The company went into the federal court Thursday and began injunction proceedings against the Amalgamated Association, its officers and members. Then came the arrest of the rioters.

All attempts toward mediation were rejected by the company. This stand met with general public approval. Hugh D. Friel, representing the Department of Labor, and Herman R. Witter of the State Industrial Department were the most active in the work of trying to effect a reconciliation. One Congressman tried his best to bring about a conference, as did four ministers and two city Mayors. All failed and the company sat tight in its determination not to deal with the union or union representatives. It remained for an employee long in the service of the company to secure the best terms.

The aces of the Amalgamated official board were called to Akron during the strike. Edward McMorrow, veteran strike leader, was the first on the ground. Then came Albert Jones, another experienced vice-president, and lastly came Patrick J. O'Brien, also a vice-president of the Amalgamated. Public sentiment was so strongly in favor of the company in its determination to break union domination that none of these men could get a foothold. They were rebuffed at every turn. Prominent residents of Akron and Canton called company officials on the telephone and wrote letters urging the company not to compromise with the union. "We have suffered enough from strikes in the past; end this one right," was the public stand. In Akron city and Summity County the authorities preserved order from the first day. No crowds were permitted to congregate in the street and an attempted parade of union men and women was blocked.

The people served by the city lines of the company have suffered great inconvenience from strikes during the

last twelve years. Always the Amalgamated Association, through public aid, has forced a satisfactory union compromise. This time the union found a different public attitude, with the result that the union is today a wreck.

The strike has shown the company that a more satisfactory transportation service can be given along certain car lines with buses. It is, therefore, possible that the Bowery, North Howard and Grant Street car lines will soon be discontinued. It is probable, too, that the Massillon City system will soon give way to a bus system. The company has not been hurt materially by the strike. Little damage was done to equipment, while bus revenue has almost kept up to the car revenue. The strike expense was small and the general feeling is that so far as value is concerned the result far exceeds the cost.

No strike breakers were employed. Practically all men who operated cars were either regular employees or men who resided in Canton or Akron. A few experienced men who of their own accord came to the property from other cities were employed.

Wage Negotiations Under Way in Boston

Negotiations are in progress over a new wage agreement between the Boston Elevated Railway, Boston, Mass., and the union. The old agreement expires on July 1. The conferences are being held at the general offices of the company. John H. Reardon, general representative of the Amalgamated Association, is assisting the carmen's committee and Edward Dana, general manager of the Boston Elevated, is sitting with the Elevated board of trustees in these negotiations. They have not proceeded far enough to authorize the publication of any of the terms they are discussing.

Present Scale Accepted in New York State

Employees of the New York State Railways in Rochester, Syracuse and Utica, voting May 24, decided by an overwhelming margin to accept the company's proposal to renew the present wage and working agreement. At a previous poll the proposition was rejected by about 250 votes.

Following rejection bargaining was resumed between the workers' representatives and company officials, which resulted in favor of renewal by more than 500 ballots. The 1925 contract expired May 1. The wage scale is to be renewed for another year.

Union officials had sought an increase of 10 cents an hour.

Rochester employees were especially insistent on the wage boost, mainly because of the fact that the company on Jan. 1 was granted a 1-cent fare increase in that city. Applications for an increase form 7 to 10 cents in Utica and Syracuse are pending before the Public Service Commission.

President Hamilton maintained that the railway's revenues did not permit of any wage increase, pointing out that any additional revenues derived from fare increases were offset by costs of the improvement program.

Offers Amendments to Milner Plan

Agreement With Prof. Riggs and Engineers Gives Control to Community Traction—Ordinance May Be Submitted

A supplementary report furnished to the city of Toledo by Prof. Henry E. Riggs of the University of Michigan outlining points of agreement between himself and engineers representing Henry L. Doherty & Company, New York, provides a basis for amendments to the Milner franchise ordinance which may be submitted to the people of Toledo at the August primaries or at a later special election. The agreement will be drafted into the form of an ordinance by city legal authorities.

The Community Traction Company is given a monopoly of street railway and bus transportation within the city limits. Definite plans are made for the scrapping of some traction lines, reconstruction of others, extension of several lines through feeder buses, the operation of fifteen bus lines eventually, and the complete rehabilitation of the company property.

It is recommended that the board of street railway control be given full authority over transit affairs and that the fares be automatically regulated by retention of the stabilizing fund. It is proposed to retain the present fare basis of 10 cents cash, three tickets for 25 cents and 1-cent transfer charge.

It is estimated that $2,860,120 would be required for the rehabilitation and new construction program over a five-year period. The engineers apportioned $1,323,748 for track work and $1,051,361 for equipment. In this latter item is $880,000 for 110 new buses to be acquired if possible on a rental basis, thereby requiring a minimum of actual capital outlay. The company would be relieved of all paving charges, and even the city would undertake to bear the cost of foundation work under tracks. The rehabilitation program would be worked out in connection with city repaving.

A concession in the power rate which would yield estimated savings of $20,000 annually has also been agreed upon by engineers. A correction for the price of coal would also be effected.

The report does not cover any change in capital value of the company, but suggests suspension of the sinking fund charges which have weighed heavily upon the company in the last five years. In its place a depreciation reserve would be set up equal to 4 per cent of the capital value each year, and when the credit balance was equal to 8 per cent of the capital value a return would be made to the usual sinking fund payments or 1½ per cent annually after 20 per cent of the capital has been retired by the sinking fund.

The engineers have estimated that with increase in population, decline in riding habit, added cost of operating the larger system and offsetting economies there would be an increase in net revenues of about $100,000 a year under the rehabilitated system. In the economies counted on there is $250,000 to be saved from eliminating bus competition, $150,000 from the extension of one-man cars, $20,000 from decreased power costs and other savings to bring a total of about $568,000 a year.

The entire report will be laid before the railroad committee of City Council by Mayor Fred J. Mery so that some concrete action may be taken at the next session of the Council.

Local Regulation in Illinois Nullified

Complete control of all utility operations and practices in the state of Illinois will henceforth rest in the hands of the State Commerce Commission, by virtue of a general order issued on May 21, in which official cognizance is taken of two recent decisions of the Illinois Supreme Court nullifying all city and village ordinances relating to the operation of public utilities within corporate limits.

In both decisions the state tribunal ruled the Illinois utility act repealed by implication certain police powers conferred on municipalities by the cities and villages act of the state of Illinois "for the protection, comfort and safety of the public and the regulation of the operation and practices of public utilities in relation thereto."

One of the decisions was a crossing protection case. In the other, the court ruled that the candlepower of street car headlights was purely a matter for the commission to decide and entirely out of the jurisdiction of the city.

Heretofore, the commission has left to the municipalities the regulation of utility operations, such as speed of cars, hours of service, etc., but it appears from the decision of the court that the commission must assume complete control of utility operation whether inside or outside cities or villages.

Federal Court Permanently Restrains Five-Cent Fare Order

A permanent injunction which perpetually restrains the Illinois Commerce Commission and the city of Chicago from enforcing the commission's orders for 5- and 6-cent fares on the Chicago Railways was entered in the Federal District Court at Chicago on May 19.

Making permanent the temporary injunction issued in 1922 enjoining the 5-cent fare and later the 6-cent fares which the commission attempted to introduce, the decree upholds the findings of Master in Chancery C. B. Morrison that these rates are confiscatory and the orders, therefore, unenforcable. The 7-cent fare which was declared the only legal rate will remain effective for the time being.

Thousands of street car passengers who have been holding transfers in the hope of obtaining a rebate were incidentally notified that they might throw them away without incurring any loss.

Had the court sustained the commission's orders, the Chicago Railways would have sought relief from the burden of paving and street cleaning costs and from paying the city 55 per cent of net earnings as prescribed by the present franchise ordinance.

Connecticut Men Accept Two-Cent Increase

The wage troubles of the railway and bus employees of the Connecticut Company, New Haven, Conn., were finally settled for another year by the employees accepting a compromise suggestion offered by the company for an advance of 2 cents an hour in wages. This makes the rate 62 cents an hour for two-man car operators and 67 cents an hour for the operators of one-man cars. The proposal of an increase was accepted by the men on all divisions except the Hartford Division. The increase will become effective June 1. In granting it the company also grants an eight-hour working day within a period of eleven hours.

On May 10 the employees petitioned the company for an increase of 15 cents an hour and the company in turn replied to the demands of the workers and offered an increase of 2 cents an hour. The matter was taken up by the union and it was decided to submit the offer of the company to the workers themselves to settle it by vote.

Contracts for Toledo Interurban Not Yet Renewed

Contracts under which the interurban lines use the tracks of the Community Traction Company, Toledo, Ohio, expired on May 1 and as yet no conferences have been held regarding renewal of the agreements. Commissioner E. L. Graumlich has called attention of company officials to the necessity of increasing the rentals to reimburse the company for delays and heavy maintenance costs in the downtown district.

During the last few weeks a new traffic control system has been studied for use in the downtown district to facilitate the movement of both street cars and automobiles. The new leasing contract may be held up pending the solution of this problem. Moreover, there is a possibility that a shorter loop for the interurban lines will be arranged. At the instance of the Toledo Automobile Club the city officials are making a survey to determine what effect stopping of interurbans at the city limits would have on elimination of congestion of traffic on downtown streets.

Franchise Talk Renewed in St. Louis

Except for the settlement of two points at issue city officials of St. Louis, Mo., and officers of the St. Louis Public Service Company, St. Louis, Mo., are agreed on the terms of the service-at-cost franchise under which the new company will operate when it takes over the property of the United Railways after foreclosure.

The chief point at issue is the mill tax levied against fares. The United Railways is in arrears $3,000,000 on this tax. It has not been decided how this sum shall be paid off and whether the city shall continue to collect the tax. The reorganization committee has admitted the outstanding obligation to the city, but desires to pay off the debt over a period of years.

The new company would eliminate the tax as a burden on car riders—the class least able to pay any taxes—but the city pleads necessity, pointing out that it has reached the constitutional limit on direct taxes, $1.35 on each $100 valuation. It needs the $600,000 raised annually through the mill tax and prefers to let the car riders pay rather than impose other indirect taxes on the citizens.

If the city insists that the tax continue in effect company officials have suggested that it be paid only if a sum sufficient to do so remains in the treasury after the company has paid off every other obligation and paid itself a return on a fair valuation.

The other point at issue is whether a clause in the new ordinance shall provide that should any part of the new franchise ordinance be declared illegal other clauses shall not be affected, and the franchise shall continue in full force and effect.

Ten Cents in Salt Lake City

An increase in cash fares to 10 cents, with three tokens for 25 cents, was allowed the Utah Light & Traction Company, Salt Lake City, Utah, in a decision of the Public Utilities Commission rendered on May 19. In the same decision the commission denied the application of the company for permission to increase student commutation tickets from 50 for $2 to 40 for $2. The ruling also made permanent the weekly pass of the company. Heretofore the use of the pass has been only a temporary arrangement. The commission ruled that the price of that pass should remain as now, $1.25 for one zone, $1.75 for two zones and $2.25 for three zones. Another part of the order stated that the railway was to sell books of thirteen commutation tickets for $1. The new tariff became effective on May 23.

In its application to the commission for permission to raise its rates the company asked for a 10-cent cash fare, three tokens for 25 cents, the increase on student tickets as stated, the elimination of books of commutation tickets and the keeping of the weekly pass at present prices.

The commission in arriving at its decision declared that it was a well-established principle that fares should be commensurate with the cost of operating a public utility, and paying a fair return to those who had risked their money to provide facilities for rendering public utility service. The commission held that car fares bear a direct relation to efficient service, "and efficient service, in the last analysis, means all the comfort and convenience to a car rider that is generally desired." The commission in its conclusion stated that "under present conditions and circumstances the new rates should prove sufficient to enable the applicant to provide adequate and efficient street car service."

The hearing before the commission on the application lasted a week or more, and the case was then held open until April 30, on which date final arguments were heard. The commission ordered the suspension of the proposed rates until May 20, or such time as it should require to decide the case. Most of the objections were against the maximum fare and not against the idea of an increase.

Negotiations for New Franchise in Kansas City Proposed

Five points will dominate the negotiations for a new franchise for the Kansas City Public Service Company, the successor under foreclosure to the property of the Kansas City Railways. They are:

Term of franchise.
Service at cost.
Inclusion of bus franchise in rail grant.
Paving and street cleaning.
Extensions.

It has been made plain that the company would not insist upon the proposed service-at-cost plan, but would present the plan in an effort to convince the city it was the modern and most satisfactory way of fixing fares.

Elimination of the clauses in the present franchise requiring the company to pave between the tracks and 18 in. on each side of the tracks, and to pay for street cleaning on the rights of way will be asked by the company.

A new 30-year franchise, instead of an amendment to the present franchise, is desirable, because it would aid in refinancing the company.

Inclusion of the bus franchise will be asked as a means of stabilizing the company and to aid in establishing the company on a sound basis.

Present Wage Scale in Davenport Continued

The Tri-City Railway, Davenport, Iowa; Moline and Rock Island, Ill., has signed contracts with its operators, continuing the present scale until June 1, 1927, and indefinitely thereafter until either party opens negotiations by giving 30 days notice. The scale graduates from 54½ cents an hour for three months men, 56½ cents for six months men and 58½ cents thereafter.

A few minor concessions were made in working terms.

Car Line at Fort Dodge to Be Restored

Residents of Fort Dodge, Iowa, have organized the Street Railway Operating Company and are making plans to operate the one local car line in the city with equipment leased from the Fort Dodge, Des Moines & Southern Railroad. The new company has filed articles of incorporation with the Recorder of Webster County. It expects to be operating cars in the city within 30 days.

Officers of the company are: Henry Schultz, president; Jay Pooler, vice-president; Harry Davidson, secretary, and Mrs. Fred Dahleen, treasurer. Directors are: William Hay, Fred Carlson, Andrew Braso, George Leslie, A. E. Newsum and the officers.

Five hundred shares of stock at a par value of $10 will be sold to residents in the districts served by the line. Backers of the move predicted that the stock would find a ready sale.

The car line connects the business section of Fort Dodge with the two railroad stations and runs out to Gypsum City. It is about 4 miles long. Service was discontinued on Nov. 14, 1925, by the Fort Dodge, Des Moines & Southern Railroad on the ground that the line was losing money.

Paul Renshaw Gets Utility Prize

Paul Renshaw, advertising manager of the Memphis Power & Light Company and the Memphis Street Railway, Memphis, Tenn., was winner of the national prize awarded for the best contribution on the subject of public relations in the electric light industry at the Atlantic City meeting.

The prize is a cash award of $250, donated by Martin J. Insull, president of the Middle West Utilities Company.

Mr. Renshaw's paper discussed the subject from the threefold phase of "why public relations are conducted," "how they may be successfully promoted," and "results that may reasonably be expected."

Each contestant in the competition was allowed the latitude of personal judgment in the manner of treatment, and the committee's award was made on the basis of which article they considered best in its treatment of the entire subject.

Scranton Routes Being Studied

Traffic engineers employed by the Fitkin interests of New York, which control the Scranton Railway, Scranton, Pa., and who are now engaged in a study of Mayor E. B. Jermyn's proposal to reroute trolley cars in the central city, are expected to complete their report soon. The report is to include a cost estimate. The Mayor's scheme calls for the elimination of service by electric railway on Washington and Wyoming Avenues and Linden and Spruce Streets. The tracks will not be removed, however, until the new trolley routing system has been thoroughly tried out.

News Notes

Guess Traffic—Prize a Pass. — The Tacoma Railway & Power Company, Tacoma, Wash., is offering weekly passes as prizes to those who make accurate guesses of its weekly traffic. Only one guess is allowed to each person. A recent first prize was won by Mrs. Herman Shroeder. Her guess was 447,000 and the actual number of rides was 447,263.

Seeks Eight Cents in Hannibal.—An increase in railway fares from 6 cents to 8 cents is sought by the Hannibal Railway & Electric Company, Hannibal, Mo. In an application filed on May 15 with the Public Service Commission the company declared that competition of "unregulated and unrestricted" bus lines had resulted in heavy financial loss to the company and threatened suspension of service. The Hannibal company charged a 5-cent fare until Feb. 1, 1924, when the fare was increased to 6 cents by the Public Service Commission.

"Personal Touch" Successful in Evansville. — Gus Muhlhausen, vice-president of the Evansville Suburban & Newburgh Railway, Evansville, Ind., has found that the "personal touch" pays in the traction business. His interest in community development has resulted in traffic increases. He assists the Boonville Business Men's Association in staging an auction and bargain day in Boonville twice a month and on these days the Boonville traction lines haul a large number of passengers into the town. Two of these auction and bargain days have already been held and they have proved very successful.

Rates in Kansas City Extended.— The Public Service Commission on May 15 issued an order extending the present rates of the Kansas City Railways, Kansas City, Mo., for six months from May 18.

Temporary Increase Allowed.—The State Public Service Commission has granted the Wheeling Public Service Company, Wheeling, W. Va., a temporary increase in rates between Wheeling and the "S" bridge at Elm Grove. The increase becomes effective on June 1. The new fare schedule authorizes a new zone, which will make the fare between Wheeling and Elm Grove 15 cents. The new zone extends from Wheeling proper to Glenwood, with a cash fare of 8 cents or ticket fare at 6 cents. The third zone will extend from Wheeling Park to the "S" bridge.

Would Extend Freight Service.—The Oklahoma Railway, Oklahoma City, Okla., is planning to extend its freight service to Piedmont. The proposal includes the building of a track between Piedmont and the El Reno line. It is estimated that the work will require about $90,000. It is because Piedmont is now without a rail connection with Oklahoma City that its citizens are desirous of obtaining the fast freight service. They have already obtained the approval of the Oklahoma City Chamber of Commerce.

Increased Fare Sought.—The Philadelphia Railways, connecting Philadelphia, Eddystone and Chester and operating under agreement the Essington Division of the Chester & Philadelphia Railway, has applied to the Public Service Commission for a new tariff which provides for a substantial increase in existing rates of fare. The present rate between Third and Jackson Streets, Philadelphia, and Hog Island Junction, at the west side of the Penrose Ferry Bridge, is 7 cents. Under the new schedule it will be 10 cents. Similarly the rate from Hog Island Junction to Bow Creek will be increased from 7 cents to 10 cents. The Philadelphia Railways was incorporated under the laws of Pennsylvania in 1911, as successor to the Southwestern Street Railway, the property of which was sold under foreclosure on April 21, 1911. The property was taken over on Dec. 10, 1918, by the Emergency Fleet Corporation, but on June 1, 1922, was returned to the company.

Prefer Fifteen-Minute Schedule. — The trolley line between Worcester and Leicester, Mass., is operating on a fifteen-minute schedule following a poll which was taken to determine the sentiment of the Leicester and Cherry Valley commuters. The poll resulted in 141 votes in favor of the fifteen-minute schedule, while three voted for the old hour schedule. Twelve riders signified they were indifferent. The voters were called upon to state their preference of "one through car" once an hour or the fifteen-minute schedule. A tabulator was assigned to ride each through car and determine the sentiment.

Summer Excursions Planned. — The Indiana Service Corporation, Fort Wayne, Ind., will again run excursions this summer to Niagara Falls, N. Y., and Toronto, Canada. This plan was announced by J. A. Greenland, general passenger and freight agent. These excursions are run over electric lines to Toledo, Ohio, and the rest of the trip is made by boat.

Refuses Franchise Renewal. — The East St. Louis, Ill., City Council by a vote of three to two recently refused to renew the Third Street franchise of the East St. Louis Railway. A week prior to the vote the Council ordered the company to take up its tracks on Third Street between Broadway and Missouri Avenue. The company claimed that the tracks on Third Street were necessary for the maintenance of good street car service in the city. The railway has appealed to the Illinois Commerce Commission.

Will Extend Line if Workers Desire It.—Questionnaires are being circulated among employees of the larger River Road industries at Buffalo, N. Y., by the International Railway to determine the advisability of extending the company's traction service on this line. The plan was evolved by B. J. Yungbluth, president of the International Railway, as a guide to the schedule department of the company. About 15,000 workers are employed in the large River Road industries north of the Buffalo city line. Increased night work in these mills makes an extension of the night service on the River Road traction line a necessity, but the company is anxious to determine how many workers would avail themselves of the company's facilities and how many use motor cars to and from work. Already the company has improved its service on the line and additional service also is planned.

Arbitration to Decide Wages in Peoria.—Representatives of the trainmen, carhouse men and shop employees of the Illinois Power & Light Corporation stationed at Peoria, Ill., have agreed with representatives of the company on wage arbitration. Henry Mansfield will represent the employees and E. E. Soules the traction company. Both served on a similar board last year. The trainmen have asked a 10-cent increase over the present wage of 55 cents, which is also paid to the bus operators. Shopmen are on a sliding scale.

Commission Orders Traffic Control.— Full traffic control on the Oregon Electric Line and the River Road at Island Station will be established, according to an order issued by the State Public Service Commission. Trains may pass this intersection at a speed of only 10 miles and motor traffic must come to a complete stop. The Portland Electric Power Company must also construct at its own expense stop signals on each side of the track at this point, and shall also erect on each side of the approaches of this crossing at a distance of 50 ft. therefrom stop posts of the usual standard with black and yellow stripes, equipped with red lights or similar reflective devices that offer a warning at night.

Recent Bus Developments

Interstate Suit Over Until Fall

So far as the United States Supreme Court is concerned that angle of the litigation between the Interstate Buses Corporation and the Holyoke Street Railway, Holyoke, Mass., already appealed to it will remain in *status quo* over the summer holidays. The court on May 24 denied the motion of the Buses Corporation for an immediate restraining order, but granted its motion to advance hearing of the case on its merits and fixed the date as Oct. 4.

The Interstate Buses Corporation, a Connecticut corporation, operates, among others, a line of passenger buses between Hartford, Conn., and Greenfield, Mass. For a portion of this route its vehicles parallel the tracks of the Holyoke Street Railway. That company, charging unfair competition, sued the bus company in a Massachusetts state court. Among other things it alleged illegal operation in that the bus corporation had not complied with the Massachusetts law of 1925 requiring that where intrastate business is done by a bus company it shall secure license and permit, failure to do so being termed a nuisance. The bus corporation had this suit removed to the United State District Court. The president of the street railway company thereupon secured warrants against various drivers and other employees of the bus company and a number of them were fined in court.

The federal district court granted an injunction to the railway company until the bus company complied with the state law and dismissed a cross-bill filed by the bus corporation seeking an injunction against arrest of its employees. From dismissal of its cross-suit the bus company appealed direct to the Supreme Court, and it was on this that the rulings on the motions were made on May 24. The bus company has appealed to the U. S. Circuit Court of Appeals from the injunction against it, being unable to carry this case to the Supreme Court direct from the district court.

I. C. C. to Inquire Into Bus Competition Pending Legislation

An investigation of bus and motor truck operation by the railroads of the country and of bus and truck competition with the railroads was ordered by the Interstate Commerce Commission on May 25.

In ordering the investigation the commission said it appeared that the operation of buses and trucks by or in competition with the common carriers of the country was increasing and likely to increase further. Therefore it was concluded the commission should take cognizance of this form of transportation and its effect on the railroads in traffic handled and in revenues or rates.

Issuance of the order follows closely on the determination of the Senate interstate commerce committee to table for the present session the bill putting motor trucks and buses engaged in interstate traffic under the jurisdiction of the commission.

The idea of the commission is to make an independent investigation of the facts for use as a background in the adjudication of the pending cases in which motor transportation is a factor. Public hearings will be held in Washington and other cities.

Steam Railroad's Plea Denied

Buses run in the interest of the Boston & Maine Railroad will not be permitted to compete with the railway lines of the Cumberland County Power & Light Company, Portland. The Public Utilities Commission would not grant the Boston & Maine Transportation Company a permit to run the buses. At the hearing the railroad disclaimed any wish to compete with the trolley lines. It explained that it desired to eliminate train stops at several of its stations on the route to Old Orchard. The commission felt that no restrictions that might be imposed would prevent some competition and that the replacement of train service would be disastrous to the communities served. This is another instance of a ruling adverse to an applicant seeking to establish bus service in Maine that might prove to be competitive.

Sightseeing Subterfuge Squelched

Justice Young of the Court of Special Term, State of New York, granted a permanent injunction on May 26 against the Mount Vernon Sightseeing Bus Company and Harry Pollowitz on application of the Westchester Electric Railroad, a subsidiary of the Third Avenue Railway system, New York, and of the New York Central Railroad, co-plaintiff. The defendants had obtained a permit from the city of Mount Vernon, but had failed to apply for a state certificate of necessity and convenience on the allegation that they were operating a sightseeing service. General Superintendent Thompson and Assistant General Superintendent Wheeler testified as to the traffic carried by trolley cars to the subway terminus near the Mount Vernon-New York City line, while Walter Jackson, consulting engineer, testified for the Westchester Electric Railroad that the bus service took trade from both the railroads and the trolley company. Justice Young's decision confirms the temporary injunction granted in April by Justice Taylor.

Eureka to Vote on Bus

A bond election will be held in Eureka, Cal., on June 14 to vote approval of a $100,000 bond issue to place eight buses on the streets instead of the electric railway cars. If it carries, street car tracks will be torn up. If it fails, then a proposition will be put up to the people to vote for a $270,000 bond issue to rehabilitate the Eureka Street Railway.

Railway and Bus Company Compromise

Approval was given by the Public Utilities Commission to a municipal permit allowing Arthur J. Seldney to operate a bus between Morristown and Morris Plains. The route, about 5 miles long, parallels the tracks of the Morris County Traction Company in Park Place and Morris Street, Morristown. The fare will be 7 cents one way. School children will be carried at 7 cents for two rides. Mr. Seldney agreed to discontinue his bus line between Morristown and Rockaway in competition with the Morris County Traction Company.

Mr. Seldney and officers of the railway will meet with the board's traffic inspector and go over the proposed new route to make restrictions preventing competition. It was agreed by Mr. Seldney not to pick up or discharge passengers in Hanover Avenue within 300 ft. of Speedwell Avenue, and that conspicuous signs be placed indicating the bus stops.

As receivers for the Morris County Traction Company, Joseph P. Tumulty and Joseph K. Choate were granted permission by the board to suspend railway service between Springfield Center and the Central Railroad station in Elizabeth, and to substitute two emergency buses.

Compromise in Manitowoc

Compromising with the Wisconsin Public Service Corporation on a new and revised bus fare schedule of three tickets for 25 cents, seven for 50 cents and a 10-cent cash fare, the City Council of Manitowoc, Wis., by a vote of twelve to two accepted the corporation's proposal to discontinue the present unprofitable railway service in favor of bus service. This change in city transportation facilities will be provided in the form of a four months experiment and will commence about June 1.

Should the riding public express dissatisfaction with the bus service, the traction company has promised to return to the use of street cars. In view of the city's consent the proposal will now go to the Railroad Commission for its approval or rejection. The various steps in the proposed change have been referred to in the ELECTRIC RAILWAY JOURNAL from time to time.

New Line Planned.—The Lehigh Valley Transit Company, Allentown, Pa., has applied to the Public Service Commission for permission to discontinue service between Lansdale and Chestnut Hill. At the same time its subsidiary, the Lehigh Valley Transportation Company, has applied to substitute a bus service on the same route. H. F. Dicke, vice-president of both companies, said that for some years the Lehigh Valley Transit Company has been operating the Chestnut Hill service at a loss. He said that improvements were being made by the Commissioners of Montgomery County which, in the event of the railway service not being abandoned, would involve the company in an immediate expenditure of $37,000 and an additional sum in the next ten years of $238,400.

Bus to Replace Railway in Hornell.—The Hornell Traction Company, Hornell, N. Y., after 33 years of operation, has announced that it will suspend its city and Hornell-Canisteo lines Aug. 1. An application for a bus line to replace the railway service has been submitted to the Council by Raymond E. Page, receiver for the traction company. It owns and operates about 15 miles of local lines in addition to the 5-mile interurban route between Hornell and Canisteo. The present carhouse will be used as a garage and repair shop for the buses. Local trolley fares, now fixed at 8 cents, would be raised to 10 cents on the buses and the 16-cent fare from Hornell to Canisteo would be raised to 20 cents. It is proposed, however, to sell three bus tickets for 25 cents.

Bus Service in Keene Being Planned.—The Keene Electric Railway, Keene, N. H., is planning to establish bus service in various sections of Keene. The company, operating 10 miles of line, was recently granted authority by the Public Service Commission to use buses on city lines.

Will Operate in Mississippi Towns.—The City Bus Company has been organized as a subsidiary of the Mississippi Power Company for the purpose of taking over and operating the bus line now in service between Pass Christian, Biloxi, Gulfport and other Harrison County coast points. Application has been filed with the Mississippi Railroad Commission for a certificate of authority to begin operations. This is required by an act passed at the last session of the Legislature placing all bus lines under the supervision of the Railroad Commission. The City Bus Company, it is understood, will extend its service to Bay St. Louis, Ocean Springs and several other points as soon as bridges are completed across the Bay of St. Louis and Biloxi Bay.

Beautiful Trips Planned.—The International Railway, Buffalo, in co-operation with the Philadelphia Rapid Transit Company, and Mitten Management, Inc., of Philadelphia plans to start de luxe bus service between Buffalo and Philadelphia this summer. Two days will be required to make the trip over the scenic highways between Buffalo and Philadelphia. Only through passengers will be carried because no local franchises have been obtained from the cities and towns through which the buses will operate. Interstate bus service does not require local franchises.

Railway Buys Bus Franchise.—A franchise for operating bus routes on the west side, south of Main Street, Binghamton, N. Y., was sold on May 10 to the Binghamton Railway after three adjournments. The price was $450. Franchise for the route must also be obtained from the State Public Service Commission. The maximum fare allowed by the city is 7 cents.

Independent Passes to Traction Interests.—The Indiana Public Service Commission recently approved the sale by the Mid-West Transit Company of its permit to operate a line between Indianapolis and West Lafayette to the Indiana Motor Transit Company, a subsidiary of the Terre Haute, Indianapolis & Eastern Traction Company. This line passes through Lafayette, Lebanon, Stanton, Royalton, Traders Point and Flackville. The Motor Transit Company already owns the original Hiner line between these two terminals and plans to abandon operations under one of the certificates. The commission authorized Charles Allen & Sons to discontinue operation of a bus route between Monon and Lafayette on the ground that the line is not a paying proposition.

Bloomington Gets Buses.—Six new Mack buses were placed in service on a new cross-town line in Bloomington, Ill., recently by the Illinois Power & Light Corporation. The buses are being operated on a 7½-minute headway. They will serve a section of the city heretofore not conveniently accessible to street car lines. Railway service on one route which is paralleled by the bus line will be discontinued. The same fare prevails on both street cars and buses. Transfers are being issued at regular transfer points.

New Bus Route Authorized.—The City Council of Lackawanna, N. Y., has granted a franchise to the Hamburg Railway, Hamburg, N. Y., to operate buses from the Buffalo city line at Abbott Road through Lackawanna and Blasdell to Woodlawn Beach, a lake shore summer resort. The fare will be 10 cents for adults and half fare for children under twelve years of age. Buses will be operated on a 40-minute schedule. Single-deck buses will be purchased for this new route.

Bus Permits Rescinded.—The Common Council of Syracuse, N. Y., has rescinded permits granted to a number of bus line operators prior to Jan. 1, 1925. This is the result of long litigation. The permits invalidated include that of T. C. Cherry and the Mid-State Coach Corporation. This company, a subsidiary of the Empire State Railroad, has filed a petition with the Public Service Commission for permission to establish a line to Oswego.

Bus Line Extended.—The Berkshire Street Railway was recently granted a license by the city of Pittsfield, Mass., to operate a bus line through that city to the Lennox boundary. The granting of this license was the last link needed to provide the bus service planned by the street railway from Pittsfield to Great Barrington. The towns south of Pittsfield granted the company the necessary licenses some time ago.

Bus Operation Looks Hopeful.—Bus operation on the Syracuse & Eastern Bus Lines, Inc., a subsidiary of the Syracuse & Eastern Railroad, Syracuse, N. Y., is beginning to show an increase, and company officials are predicting that the company may break even this year, compared with the deficit of $1,511 for 1925. The net income for the first three months of 1926 on the bus lines was $892. Cash fares were 139,675, an increase of 63,091 compared with the first three months of 1925.

Another Extension of Bus Permits.—The Massachusetts State Commission of Public Utilities has announced that the temporary permits granted for the operation of buses will be extended to June 30. These permits were originally expected to terminate on Dec. 31, 1925, and were extended to May 31.

Buses in Danville.—Buses will be introduced in Danville, Ill., soon by the Illinois Traction, Inc. Michael Connor, superintendent, announced that a fifteen-minute service will be established over the first route and other lines which would be established as quickly as possible. Authority to use buses was recently granted by the Illinois Commerce Commission.

Council Disapproves Voters' Views on Lines.—The Buffalo, N. Y., City Council failed to approve a proposed referendum which would allow registered voters to express their views on franchises authorizing the International Railway to start two new bus lines and scrap several existing car lines in the city. Petitions for a referendum now have more than 15,000 signatures. Under the city charter a referendum is allowed on all franchises if a sufficient number of voters demand the right to express their views on the grants at the polls. In view of the attitude of the City Council, it was agreed to hold up the bus permits until the return to Buffalo next month of Mayor Frank X. Schwab, who is touring Europe. It is doubtful if the bus service will be started this year because no referendum could be held until November unless the expense of a special election is decided upon.

Will Serve Western Section.—The Rochester Co-ordinated Bus Lines, Inc., subsidiary of the New York State Railways, will start bus service on a new line on the west side, to be known as the Glide Street route, following a grant by the Council. The new line will serve as a feeder to the Emerson Street car line, in accordance with the general policy of the New York State Railways to co-ordinate bus and railway service. The new route will serve a populous residential and factory district on the extreme western limits of the city.

Radial Service Discontinued.—The Canadian National Electric Railways has withdrawn its Weston-Woodbridge radial service on the Western Road, Toronto. Five buses, each seating from 20 to 22 passengers, are now handling the traffic. Although only one car was operated, the radial service ran at a loss all through the winter, it was learned, and the authorities apparently determined that a continuance of the service during the summer meant even heavier losses. The radial fare from Weston to Woodbridge was 16 cents, compared to 25 cents on the buses.

Bus Service in Jacksonville, Ill.—The Illinois Power & Light Corporation suspended railway service between the city square and Nichols Park in the city of Jacksonville, Ill., when it placed in operation on May 7 two new Graham Brothers buses with a capacity of 21 passengers each. For the time being, bus passengers will be carried at the prevailing car fare of 7 cents, although the company states it will probably be compelled to ask a 10-cent fare.

Opposes Bus System.—The Knoxville Power & Light Company of Knoxville, Tenn., has indicated that it will oppose the franchise bid sought by a bus transportation system for operation over certain streets in the city of Knoxville. The railway has stated that its "investment in Knoxville would be impaired by the proposed competition."

Financial and Corporate

Judge Stone to Confirm Sale of Kansas City Railways

Judge Kimbrough Stone has decided to overrule objections to the foreclosure sale of the property of the Kansas City Railways, Kansas City, Mo., voiced by the second mortgage bondholders and the stockholders of the railway.

Judge Stone's intention to enter an order confirming the sale of the railway to Powell C. Groner has been communicated to R. J. Higgins, who, as attorney for the trustees under the first mortgage, had filed a motion asking for the confirmation.

Powell C. Groner, whose nominal bid of $8,000,000 is to be confirmed, made that bid for the first mortgage bondholders.

The reorganization committee, with Newman, Saunders & Company as reorganization managers, have a corporate vehicle ready in the Kansas City Public Service Company, with William G. Woodfolk as president. In the interval of the transfer the property will remain in charge of Francis M. Wilson and Fred W. Fleming, receivers.

It is said that the fact that Blatchford Downing, attorney for the second mortgage bondholders, has indicated he will carry the case to the court of appeals probably will not interfere with the physical transfer of the property and the termination of the receivership.

Mr. Downing and also Frank P. Sebree, attorney for stockholders, have objected to confirmation of the sale mainly on two grounds, the basis of settlement with the damage suit creditors and the alleged insufficiency of Mr. Groner's bid.

New York Central Advances Money to Traction Lines

In the report of the board of directors to the stockholders of the New York Central Railroad, New York, N. Y., for the year ended Dec. 31, 1925, the company states that there was advanced to the New York & Harlem Railroad in connection with the operation of its traction lines in New York City the sum of $205,000, making the total advances for this purpose to Dec. 31, 1925, $1,312,000. There was advanced to the New York State Railways on its demand notes $1,475,000 and to the Schenectady Railway, also on demand notes, $233,150.

Terms of Distribution of Ohio Traction Assets Decided

Directors of the Ohio Traction Company, Cincinnati, Ohio, have accepted the offer of committees representing preferred and common stockholders to purchase outright the assets of the Ohio Traction Company, Cincinnati Traction Company and Cincinnati Car Company for $5,950,000. This offer is to be submitted to the stockholders at a meeting on June 22. The proposed plan includes organization of a new corporation whose stock will be distributed to Ohio Traction stockholders at a rate of 2½ shares of new stock for each share of preferred deposited, and one share of new stock for three shares of old common deposited. The matter was referred to at length in the ELECTRIC RAILWAY JOURNAL for May 8, page 822.

Automobiles Continue to Affect Income of Washington Company

For the year ended Dec. 31, 1925, the net income of the Capital Traction Company, Washington, D. C., was about $50,000 less than the amount required for the 7 per cent dividend. Operating expenses increased slightly, due entirely to the great increase in the bus service furnished, rail operations costing less than in 1924. Increased competition of privately owned automobiles and of buses continued to cause a decrease in street car traffic, with a corresponding falling off in revenue. The report of George E. Hamilton, then president of the company, to the stockholders, says that it is encouraging to note that the loss in passengers carried for the year 1925 compared with the preceding year was less than 2 per cent, a smaller loss than that of any year since 1919, and also that the last few months of the year showed an actual gain in passengers carried.

Two additional bus lines were established and one purchased during 1925. Capital expenditures for the year amounted to $228,575, the larger part of which consisted of betterments in connection with renewal of track and the purchase of additional buses. Six parlor car coaches were purchased to be used on the Chevy Chase Coach Line and two smaller street car type vehicles for the feeder line near Chevy Chase Circle. No additional street cars were purchased.

Depreciation reserve increased from $2,075,155 to $2,458,455.

The report referred to the suggestion of the North American Company looking toward a merger of the street railway companies. Mr. Hamilton states that a satisfactory base of consolidation or merger has not yet been determined, but an earnest effort is being made by the parties to these negotiations to work out a plan of merger useful and protective to the security holders and to the public.

SUMMARY OF OPERATIONS OF THE CAPITAL TRACTION COMPANY FOR YEAR ENDED DEC. 31

		1925	1924
Passenger revenue, railway		$4,482,040	$4,542,767
Bus revenue		81,877	50,383
Special car revenue		60	131
Special bus revenue		95	.....
Total revenue from transportation		$4,564,073	$4,593,282
Revenue from operations other than transportation		22,982	21,055
Railway operating revenue		$4,587,055	$4,614,337
Operating expenses (67.31 per cent of gross revenue)		3,110,085	3,073,810
Net operating revenue		$1,476,969	$1,540,527
Taxes assignable to railway operation		386,243	392,821
Operating income		$1,090,725	$1,148,104
Non-operating income		33,132	32,421
Gross income		$1,123,858	$1,180,495
Deductions from gross income:			
Interest on funded debt	$280,300		
Interest on unfunded debt	39,056		
Rent for leased road	11,721		
Income tax paid at source	4,314		
Total deductions		$335,392	$324,713
Net income		$788,465	$855,782
Profit and loss statement:			
Credits:			
Balance at beginning of year	$1,528,483		
Net income for year	788,465		
Refunds, electric light bills prior years	1,296		
		$2,318,246	
Debits:			
Dividends		840,000	
Credit balance at close of year		$1,478,246	$1,528,483

REVENUE AND TRANSFER PASSENGERS CARRIED BY THE CAPITAL TRACTION COMPANY

Railway passengers:	1925	1924
Number of passengers carried at 8 cents	16,995,347	16,427,541
Number of passengers carried at 6½ cents	45,066,128	46,846,110
Number of passengers carried at 5 cents	833,352	791,476
Number of passengers carried at 3 cents	345,131	338,017
Number of cash passengers carried on Kensington line	119,757	119,317
Number of ticket passengers carried on Kensington line	52,547	58,092
Total railway revenue passengers	63,412,262	64,580,553
Bus passengers:		
Number of passengers carried at 25 cents	71,466	.....
Number of passeogers carried at 10 cents	1,160	.....
Number of passengers carried at 8 ceots	252,588	196,068
Number of passengers carried at 6½ cents	466,617	374,078
Number of passengers carried at 5 cents	640	.....
Total bus revenue passengers	792,471	570,146
Total revenue passengers, railway aod bus	64,204,733	65,150,699
Other passengers:		
1-cent intercompany transfer passengers	2,759,208	2,794,895
2-cent bus to car transfer passengers	344,011	275,692
2-cent car to bus transfer passengers	310,712	240,160
2-cent Eastern High School ticket passengers	4	1,378
Free transfer passengers	17,111,342	17,105,848
Other free passengers:		
Employees	727,894	792,131
Policemen aod firemen*	56,714	64,190
Total passengers	85,514,618	86,424,993

*Exclusive of policemen and firemen riding free while in uniform.

New Owners Take Over Laconia Property

The Laconia Street Railway, Laconia, N. H., was acquired recently by Guy M. Tetley and Howard W. Byse, Laconia. The sale was made from the receivership of Judge Frank M. Beckford. The reorganization of the company's affairs is already under way. New officers have been elected as follows: President, Guy M. Tetley; vice-president, Howard W. Byse; secretary, Thomas F. Cheney.

Plans include the purchase of new equipment and a rearrangement of the schedules. The Laconia Street Railway is 8 miles long. It was organized in the early '80s, when horse cars were the vogue. Subsequently, the road was electrified, but a year ago the trolleys were succeeded by buses.

Alton Property Sale Set for June 16

Louis Clements, Danville, Ill., attorney, has been appointed a special master in chancery by the U. S. District Court in East St. Louis with authority to sell the properties of the Alton, Granite & St. Louis Traction Company, the Alton Gas & Electric Company, controlled by the East St. Louis & Suburban Company. The Illinois State Trust Company, trustee, is plaintiff in the action in federal court to foreclose on the $2,500,000 mortgage on the properties. The last-named corporation is a Delaware concern, the two others are under Illinois charter. The sale of the properties is ordered for June 16 at Edwardsville, Ill.

California Road Reports $94,727 Available for Surplus

Central California Traction Company, operating in Sacramento, Stockton and Lodi, reports to the California Railroad Commission its 1925 operating revenue at $592,036, compared with $592,798 for 1924.

The operating expenses, excluding taxes, for 1925 are reported at $483,069 and at $507,744 for 1924, leaving net operating revenue of $108,966 for 1925 and $85,053 for 1924. During 1925 taxes charged to operation amounted to $31,195 and for 1924 to $31,911. Deducting the taxes leaves operating income of $77,771 for 1925 and $53,142 for 1924. Adding to the operating income the non-operating income of the company results in a gross corporate income, which represents the amount available for interest, amortization of debt discount, other fixed charges, non-operating expenses, dividends and surplus, of $94,727 for 1925 and $73,969 for 1924.

Claims Against United Railways, St. Louis, for Services Disallowed

Special Master Fred L. Williams in reports filed with the United States District Court recommended that claims of A. L. Shapleigh, Richard McCulloch and Judge Henry S. Priest, totaling $125,175, against the United Railways, St. Louis, Mo., for services alleged to have been rendered be denied.

Messrs. Shapleigh and McCulloch had asked $30,937 and $24,487 respectively for acting as president of the United Railways since the receivership, while Judge Priest asked $69,750 salary as general counsel for the company.

Their claims were not resisted by Receiver Wells at the recent hearing before Special Master Williams. In his report denying the claims and recommending that this action be approved by the court Mr. Williams held that the proof offered at the hearing in support of the claims was not sufficiently definite for him to determine the reasonable value of the services which it was set up had been rendered.

Conspectus of Indexes for May, 1926

Compiled for Publication in This Paper by
ALBERT S. RICHEY
Electric Railway Engineer, Worcester, Mass.

	Latest	Month Ago	Year Ago	Since War	
				High	Low
Street Railway Fares* 1913 = 4.84	May 1926 7.36	April 1926 7.36	May 1925 7.27	March 1926 7.36	May 1923 6.88
Electric Railway Materials* 1913 = 100	May 1926 153.1	April 1926 154.2	May 1925 153.9	Sept. 1920 247.5	Oct. 1924 148.5
Electric Railway Wages* 1913 = 100	May 1926 225.4	April 1926 224.7	May 1925 222.2	Sept. 1920 232.0	March 1923 206.8
Am. Elec. Ry. Asan. Construction Cost (Elec. Ry.) 1913 = 100	May 1926 202.4	April 1926 201.3	May 1925 202.0	July 1920 256.4	May 1922 167.4
Eng. News-Record Construction Cost (General) 1913 = 100	May 1926 207.3	April 1926 207.0	May 1925 207.2	June 1920 273.8	Mar. 1922 162.0
U. S. Bur. Lab. Stat. Wholesale Commodities 1913 = 100	April 1926 151.1	March 1926 151.5	April 1925 156.2	May 1920 246.7	Jan. 1922 138.3
Bradstreet Wholesale Commodities 1913 = 9.21	May 1 1926 12.86	April 1 1926 13.11	May 1 1925 13.32	Feb. 1 1920 20.87	June 1 1921 10.62
U. S. Bur. Lab. Stat. Retail Food 1913 = 100	April 1926 162.4	March 1926 159.9	April 1925 150.8	July 1920 219.2	Mar. 1922 138.7
Nat. Ind. Conf. Bd. Cost of Living 1914 = 100	April 1926 168.4	March 1926 168.5	April 1925 164.8	July 1920 204.5	Aug. 1922 154.5
Steel Unfilled Orders (Million Tons) 1913 = 5.91	Apr. 30 1926 3.868	Mar. 31 1926 4.380	Apr. 30 1925 4.447	July 31 1920 11.118	July 31 1924 3.187
Bank Clearings Outside N. Y. City (Billions)	April 1926 18.65	March 1926 19.50	April 1925 17.82	Oct. 1925 20.47	Feb. 1922 10.65
Business Failures Number	April 1926 1743	March 1926 1882	April 1925 1667	Jan. 1924 2231	Aug. 1925 1353
Liabilities (Millions)	47.34	46.93	50.60	122.95	27.22

*The three index numbers marked with an asterisk are computed by Mr. Richey, as follows: Fares index is average street railway fare in all United States cities with a population of 50,000 or over except New York City, and weighted according to population. Street Railway Materials index is relative average price of materials (including fuel) used in street railway operation and maintenance, weighted according to average use of such materials. Wages index is relative average maximum hourly wage of motormen, conductors and operators on 137 of the largest street and interurban railways operated in the United States, weighted according to the number of such men employed on these roads. Previously the wage index applied to 144 railways. The change is due to dropping some roads where the number of trainmen has been reduced to a total of less than 100.

$313,006 to Philadelphia Surplus

P. R. T. Took in $49,911,703 in 1925—Lost $228,989 on Buses—Many Interesting Facts in Statement

Passenger revenue of the Philadelphia Rapid Transit Company, Philadelphia, Pa., for 1925, including buses, was $49,911,703. Operating expenses and taxes were $37,533,858. After providing for payments to city sinking fund, rental for Frankford elevated, fixed charges, the semi-annual dividend on preferred stock and 8 per cent dividends on common stock, $313,006 remained to be transferred to surplus.

Net income for 1925 of $3,006,727 is from the operation of subway-elevated and surface lines. From this must be deducted the loss of $233,211 resulting from the operation of buses and trackless trolley, making a net income for the entire system of $2,773,516.

During the fifteen years 1911-1925 under Mitten Management P. R. T. earned a surplus of $19,866,381. Of this $13,687,464 has been paid in P. R. T. dividends and $6,178,916 put back into the property.

P. R. T. bus system has, during 1925, been extended through the installation of nine new routes operating over 150 miles of city streets. A deficit of 228,989 resulted from 1925 operation through giving service in districts where it is needed, but which will be unprofitable for years to come. As the management sees it, this deficit does not take into consideration the much larger loss due to duplication of service through diversion of traffic from surface cars. Supplying this needed but unprofitable service by street cars would have resulted in a much greater loss.

Throughout the year 1925 P. R. T has been engaged in the presentation of facts and legal argument before the Public Service Commission demonstrating its right to continue the temporary 7½-cent token-8-cent cash fare. The Public Service Commission, in its decision handed down on Jan. 12, 1926, gave this rate of fare final approval. The P. R. T. present 7½-cent fare embodies a combined surface-elevated-subway ride.

P. R. T. has continued to work toward a transit system which contemplates co-ordinating and unifying every phase of Philadelphia's public passenger transportation. To this end the operation of street car lines, city-built high-speed lines and buses has been consolidated. As a necessary step toward further co-ordination, P. R. T. proposes to operate taxicabs and to this end has arranged, subject to the approval of the Public Service Commission, for the purchase of the Yellow Taxicab Company for $3,000,000.

Following the stockholders' approval at the 1925 annual meeting, P. R. T. presented to the city the easterly half of the P. R. T.-owned tract of ground known as Burd Home so that it might be used as an extension of Cobbs Creek Park. The cost of this acreage is continued as part of P. R. T. valuation, but the city secures ownership now, instead of waiting until the close of the city-company agreement in 1957.

Since 1912 the $10,000,000 issue of P. R. T. 5 per cent bonds had been conditionally sold or pledged at a net cost of about 7 per cent; $8,975,000 of these bonds have now been permanently sold, with interest at 6 per cent.

Early in 1925 P. R. T. offered to its customers $3,000,000—60,000 shares—of its 7 per cent cumulative preferred stock and in six days 14,000 car riders subscribed to 71,428 shares. The subscriptions were received on the cars with weekly payments thereafter made to P. R. T. trainmen.

It is explained that $10,000,000 of 7 per cent cumulative P. R. T. preferred stock has just been oversubscribed by P. R. T. car riders, in lots not exceeding 20 shares, without brokerage charges or commissions, during a sales offering upon the cars of ten days duration. More than 40,000 car riders will hold this stock.

Proceeds from this issue will be used toward payments for normal capital expenditures for improvements and extensions, for retiring underlying securities, the cost of South Philadelphia track extensions to serve the Sesqui-Centennial, purchase and rehabilitation of the Frankford, Tacony & Holmesburg Railway and to reimburse the P. R. T. treasury for reserves heretofore used to finance improvements.

Wages of employees during 1925 were based on a rate of 77 cents an hour. The basic wage for 1926 will by agreement be 73½ cents an hour in payment for average services as rendered elsewhere, and will be continued except as it may be adjusted to conform to the purchasing power of the dollar, as set forth in the plan for collective consideration, hereto appended. This change is not made for the purpose of reducing wages, but so that the last 3½ cents an hour of the wage, approximating $1,000,000 a year, shall, in so far as possible, be made dependent upon the continued efficiencies and economies of the men, to which end it is included as a part of the management's fee.

The report, dated March 1, is concluded with a discussion of the Mitten plan for 1926, in which it is said in part:

> The distinctive feature of this plan as compared to others, and the one to which its greatest success is attributed, is that men and management must agree, otherwise arbitration follows. Whereas in other plans, whether the representatives of men and management agree or disagree, their action is subject to final review and approval or veto by the head of the company.
>
> The 1926 plan again reiterates the principle that nothing shall interfere with the right of any employee to become a member of any union or organization, without let or hindrance.
>
> Working conditions are dealt with by the branch committees, from whose decisions appeal may be taken to departmental and general committees. All books of rules for the direction of employees are submitted to and receive the approval of the departmental committees before being put into effect. No change may be made in such books of rules without the approval of the departmental committees.
>
> Discipline is administered by the management and its representatives in accordance with the rules and as their best judgment dictates, but appeal from any disciplinary act of management may be taken to the branch, departmental and general committees respectively.
>
> Wages are to be determined for each class of employees upon the basis of a fixed rate established by the general committees; change in the wage base thereafter to be in accordance only with the rise or fall in the purchasing power of the dollar. Such changes are to be in relation to the changes in the composite cost of various standard market baskets, as determined upon by the general committees.
>
> Adjustment of wages to the changing purchasing power of the dollar assures protection of the present standards of living. The co-operative wage as here described assures an increasingly higher standard of living, on the one hand, through the added return to employees by their proportionate share of increasing gross earnings, and, on the other, through the investment of this added income in the industry, by the increasing dividends on their growing investment.
>
> P. R. T. employees have been receiving since 1922 a co-operative wage equaling 10 per cent of the payroll, which has been by mutual consent invested in P. R. T. stock—$10,000,000 par value, 200,000 shares—by trustees of the men, to such good effect that the present average rate of return on the money invested is almost 13 per cent per annum, which sum is paid directly to the men, according to their holdings, by the men's own trustees immediately after the payment by P. R. T. of its quarterly dividends. One-third of P. R. T. common stoke is now owned by the men, who vote this stock, through their own trustees,

Beginning with the year 1926, Mitten Management will receive a management fee of 4 per cent of the gross revenue of the system, payable cumulatively after earning the regular dividend to P. R. T. stockholders. In recognition of co-operative effort, this management fee is to be divided equally between men and management, each co-operating regular employee to be credited at the end of the year with his proportionate share.

COMPARATIVE INCOME ACCOUNTS OF THE PHILADELPHIA RAPID TRANSIT COMPANY

Year	Gross Earnings	Maintenance and Renewals	Power-Opr. Conducting Transp. & General	Taxes	Fixed Charges	Net Income
1911	$22,147,974	$3,661,198	$8,627,973	$1,591,253	$8,827,988	$560,708*
1912	23,282,408	3,492,361	9,097,061	1,659,518	8,961,126	72,342
1913	24,240,592	3,636,088	9,081,213	1,660,236	9,324,559	538,496
1914	23,961,398	3,594,209	8,825,665	1,808,951	9,531,232	201,341
1915	24,315,455	3,647,318	8,677,465	1,783,540	9,622,631	584,501
1916	27,279,517	4,091,928	9,382,541	1,812,587	9,614,908	2,377,553
1917	29,726,927	4,459,039	10,723,912	2,106,769	9,573,522	2,863,685
1918	31,704,427	4,755,664	13,355,575	2,428,819	9,629,553	1,534,86
1919	36,039,520	4,955,124	17,287,117	2,345,750	9,735,652	1,715,877
1920	39,400,341	5,965,409	20,628,504	2,601,253	9,823,110	382,065
1921	42,911,040	8,560,400	19,874,369	2,798,821	9,870,158	1,807,292
1922	43,235,972	8,560,400	20,407,117	2,586,001	9,853,177	1,82,277
1923	45,552,031	8,560,400	22,479,553	2,695,708	10,016,370	1,800,000
1924	46,215,488	8,560,400	22,678,896	2,760,903	10,404,924	1,819,365
1925	50,361,568	8,560,400	25,053,203	3,030,824	10,710,414	3,006,727

*Deficit

INCOME ACCOUNT OF THE PHILADELPHIA RAPID TRANSIT COMPANY FOR YEAR ENDED DEC. 31

	1925	1924
Gross passenger earnings	$48,827,951	$45,002,700
Other operating revenue	715,818	652,317
Railway operating revenue	49,543,769	45,655,017
Way and structures, equipment and power—maintenance, renewals and depreciation	8,560,400	8,560,400
Power operation	3,738,715	3,772,643
Conducting transportation	15,898,894	14,313,232
General	5,415,593	4,593,019
Taxes, including paving tax	3,030,824	2,760,903
	36,644,427	34,000,199
Operating income	12,899,342	11,654,817
Non-operating income	817,798	560,470
	13,717,141	12,215,288
Interest	1,399,370	1,371,252
Rentals	8,662,924	8,541,591
Frankford elevated rental	468,119	312,079
Sinking fund—City contract	180,000	180,000
	10,710,413	10,404,924
Net income	$3,006,727	$1,810,364

CONSOLIDATED INCOME ACCOUNT OF THE PHILADELPHIA RAPID TRANSIT SYSTEM FOR YEAR ENDED DEC. 31, 1925

Gross passenger earnings		$49,911,702
Other operating revenue		691,883
		$50,603,586
Way and structures, equipment and power—Maintenance, renewals and depreciation	8,760,903	
Power operation	3,738,720	
Conducting transportation	16,612,472	
General	5,350,881	
Taxes, including paving tax	3,070,879	
		$37,533,888
Operating income		$13,069,727
Non-operating income		416,857
		$13,486,585
Frankford rental and sinking fund to purchase P. R. T.		648,119
		$12,838,465
Fixed charges, dividends, etc.		12,525,459
Surplus		$313,006

INCOME ACCOUNT OF THE PHILADELPHIA RURAL TRANSIT COMPANY FOR THE YEAR ENDED DEC. 31, 1925

Passenger revenue		$1,005,338
Other revenue		26,362
		1,031,700
Operating expenses and taxes		1,135,360
Operating income		*103,659*
Non-operating income		9,443
		94,216
Fixed charges, etc.		134,773
Deficit		*$228,989*
Passengers carried		10,817,628
Average rate per passenger, cents		9.29

STREET CAR AND SUBWAY-ELEVATED PASSENGER STATISTICS

	Passengers Carried		Average Rate per Passenger, Cents		Passenger Revenue	
	1925	1924	1925	1924	1925	1924
January	76,626,563	78,297,258	5.41	4.79	$4,148,090.48	$3,748,595.68
February	70,811,587	73,247,920	5.38	4.78	3,807,920.36	3,501,989.71
March	78,940,472	79,591,970	5.36	4.78	4,234,351.70	3,802,197.01
April	77,999,649	78,235,652	5.36	4.78	4,178,685.85	3,743,361.49
May	79,579,698	81,288,979	5.33	4.77	4,240,538.85	3,880,553.43
June	74,693,804	75,366,347	5.31	4.77	3,969,166.03	3,591,596.89
July	71,601,642	71,989,422	5.29	4.77	3,790,398.32	3,430,594.88
August	70,439,444	68,650,403	5.28	4.76	3,721,880.02	3,266,126.70
September	72,747,702	71,260,433	5.31	4.90	3,863,437.61	3,490,695.31
October	81,209,381	77,796,303	5.33	5.40	4,325,415.53	4,203,772.70
November	77,846,788	74,087,646	5.33	5.41	4,151,101.32	4,010,418.26
December	81,740,396	79,491,612	5.35	5.42	4,396,965.40	4,332,798.20
Total	914,237,126	909,303,945	5.34	4.95	$48,827,951.46	$45,002,700.26

Receiver Authorized to Pay July 1 Interest.—Federal Judge Faris has authorized Rolla Wells, receiver for the United Railways, St. Louis, Mo., to pay the July 1 interest coupons on the $36,300,000 of 4½ per cent bonds of the company. The interest amounts to $726,000.

Line Abandoned.—The Denver Tramway, Denver, Col., has abandoned its Englewood-Cherrelyn line in favor of buses because of the inability of the company to make the line pay. Back in 1883 horse cars were run on this line. In 1910 the route was electrified. Reference to this plan was made in the JOURNAL for May 15, page 860.

Discontinuance Petition Opposed.—Residents of Blue Island, Harvey and other Chicago suburban towns appeared before the Illinois Commerce Commission in Chicago recently to oppose the petition of the Chicago & Interurban Traction Company to discontinue operation of cars between 63d Street, Chicago, and Kankakee. They stated that there is need for the service in various communities among the approximately 50 miles of route. The line is paralleled for the entire distance by a concrete highway and several steam railroads. Service has been conducted at a loss for a number of years. The hearing was continued.

$1,000,000 City Railway Notes Are Refunded.—Action of officials in refunding $1,000,000 three-year notes of the Louisville Railway, Louisville, Ky., which fall due on June 1, 1926, has been approved by the Board of Works. A new issue of 6 per cent notes running for two years from June 1 will take the place of the refunded notes.

Seeks to Abandon Three Miles.—The Utah Rapid Transit Company, operating in Ogden, Utah, has applied to the Public Utilities Commission for permission to abandon 2.94 miles of its electric railway system between North Ogden and Pleasant View. In the same petition the company sets forth that it may later find it necessary to ask permission to abandon the other section of the North Ogden line from the north city limits to North Ogden. Steadily decreasing revenues are given as the reason for the request.

Slight Decrease in Surplus.—For the period from Jan. 1 to March 31, 1926, the Lake Shore Electric Railway, Cleveland, Ohio, had gross earnings of $780,997, against $776,608 for a similar period in 1925. The operating expenses and taxes increased from $636,417 for the 1925 period to $648,688 in the 1926 period. The surplus showed a decrease. It was $28,598 for the period from Jan. 1 to March 31, 1925, and $27,558 for the three months period of the current year.

Bonds for Betterments.—The Indiana Public Service Commission has authorized the Evansville & Ohio Valley Railway, Evansville, Ind., to issue $16,000 in first mortgage 6 per cent gold bonds at 87½ per cent of par to pay for additions and betterments. According to G. R. Millican, general manager of the company, the bond issue covers an accumulation of small items on improvements, some of which were made during the past year.

Personal Items

New Honor for E. H. Maggard

E. H. Maggard, president of the Petaluma & Santa Rosa Railroad, Petaluma, Cal., was elected president of the California Electric Railway Association at its eleventh annual meeting on May 17. The new head of the association has been in the employ of the Petaluma property since 1907, when he entered the service as general freight and passenger agent. He continued in that capacity until promoted to the office of general manager in 1916, succeeding in that position the late Elmer M. Van Frank. Prior to his association with the California property and at an early age he entered the service of the Missouri, Kansas & Texas Railway at Dennison, Tex., as call boy. Later he was made clerk in the freight office of the Southern Pacific at Houston. He next became identified with the El Paso & Northeastern Railway at El Paso and from that property went to Petaluma.

Changes in Scranton

Lawrence H. Stone has been transferred from the New York office of the General Engineering & Management Corporation to Scranton, Pa., as auditor of the Scranton Railway. The general auditing formerly was done in New York.

C. O. Brooks, formerly connected with the Brooklyn-Manhattan Transit Corporation, Brooklyn, N. Y., the Third Avenue Railway, New York City, and the Youngstown Municipal Railway, Youngstown, Ohio, has been appointed superintendent of equipment in place of J. F. Duffy, who resigned on May 1. Mr. Brooks' offices are located at the carhouse of the company at Providence Road.

E. L. Austin Heads Sesqui-Centennial

A. C. Baker, director-in-chief of the Sesqui-Centennial celebration in Philadelphia, Pa., has been retired as head of the Sesqui-Centennial and has been relieved of all executive duties because of illness. He will be succeeded by E. L. Austin, business manager and comptroller of the exposition. The career of Mr. Austin, formerly with the Philadelphia Rapid Transit Company, was reviewed in the ELECTRIC RAILWAY JOURNAL, issue of Aug. 1, 1925, page 185.

Promotions at Racine

Emil Jorgenson, who has been connected with the Wisconsin Gas & Electric Company for the past eighteen years, has been promoted to the post of assistant secretary and assistant treasurer, with offices at Racine, Wis. For several years past he has been auditor.

John I. Allen, assistant auditor, who joined the company's forces at Kenosha in 1912 as timekeeper and reached his present post of assistant auditor three years ago, has been promoted to auditor to succeed Mr. Jorgenson.

Alfred H. Marsh has been appointed supervisor of the recently formed accident prevention bureau of the Brooklyn-Manhattan Transit Corporation, Brooklyn, N. Y. Mr. Marsh has been connected with the Brooklyn system more than 34 years. He has had experience as conductor, inspector, dispatcher and depot master in the surface transportation department, and later as investigator and adjuster in the claim department. He also served as special investigator, managing clerk and special adjuster in the law department. In his new work Mr. Marsh will conduct all investigations, tabulate all accidents and make studies of the conditions and hazards pertaining to the various lines.

Leslie Wipperman, who has been manager of the Wisconsin Rapids Street Railway, Wisconsin Rapids, Wis., for many years, has resigned from that post. He has no definite plans for the future. John Shanks, who has been connected with the company's properties at Negoosa, has been selected to succeed Mr. Wipperman.

George T. McIntosh has been appointed statistician for the Winnipeg Electric Company, Winnipeg, Canada.

C. A. Wait, assistant to the president of the Illinois Power & Light Company, Chicago, Ill., has taken over the additional duties of director of public relations of the Illinois Traction System.

R. C. Slye, who has been chief clerk at the Milwaukee, Wis., office of the Chicago, North Shore & Milwaukee Railroad for many years, has been promoted to the post of city passenger agent, giving the Milwaukee office two city passenger agents. C. G. Miles, Fort Wayne, has been appointed Mr. Slye's successor.

T. Justin Moore, general counsel of the Virginia Electric & Power Company, Richmond, Va., was appointed vice-president at a recent meeting of the board of directors. He succeeds E. Randolph Williams.

Obituary

Henry Fleetwood Albright, vice-president in charge of manufacturing and a director of the Western Electric Company, died on May 11. His outstanding contribution was in scientific factory planning and management. He began his business career as an office boy with the Union Pacific Railroad in Philadelphia.

Augustus Barnes, assistant to the president of the People's Motorbus Company, St. Louis, Mo., and the man who obtained the original bus permits for that company, died at the Jefferson Hotel in that city on April 25. He had been ill about ten days. When the Hertz interests entered the St. Louis bus field and the People's Motorbus Company was finally organized Mr. Barnes was named assistant to the president in charge of publicity and public relations.

Manufactures and the Markets

News of and for Manufacturers—Market and Trade Conditions
A Department Open to Railways and Manufacturers
for Discussion of Manufacturing and Sales Matters

G. E. Will Exhibit at Atlantic City Convention of A. R. A.

At the convention of the Mechanical and Purchases and Stores Divisions of the American Railway Association, to be held at Atlantic City, June 9-16, the General Electric Company will occupy booths 5, 60, 62, 64, 66, 68, 70, 72, 74 and 76. Its exhibits will include electric and oil-electric locomotives, gas-electric cars, a complete line of car shop control equipment, motors, arc welding equipment, flow meter equipment, Fabroil and Textolite gears, floodlighting projectors, fuse cords and phono-electric cells.

Coal Bill Will Be Reported

Assurances have been given the President by Chairman Parker of the House committee on interstate and foreign commerce that a coal bill will be reported by his committee and will be pressed for passage at this session of Congress. The President has been advised further that a majority of the committee has come to an understanding as to the principle of the bill which will be recommended, although the details of the bill have not been worked out as yet.

It was stated at the White House that this information is very gratifying to the President and that he thinks Congress should enact legislation at this session along the lines that have been indicated.

Abuse of Time Selling Plan in Bus Field Is Dangerous

Expressing doubt as to the advisability of selling commercial motor vehicles on the time-payment plan with insufficient down payment and ensuing payments spread out too long, the *Wall Street Journal* for Saturday, May 8, pointed out that the problem of disposing of repossessed buses and trucks is becoming an increasingly important one with the manufacturers. Bankers are sounding a note of warning against the practice mentioned above, which condition has been brought about by the extremely keen competition which has arisen in the commercial motor vehicle field, this having resulted in the extension of unusually liberal terms to prospective purchases by many of the leading manufacturers. The *Wall Street Journal* states that the report is current in the trade that at least one important manufacturer has on hand nearly $1,000,000 worth of repossessed vehicles, on which the purchasers have failed to continue their payments, and the smaller concerns are in a relatively similar position.

The *Journal* goes on to state:

When the practice of time selling of trucks and buses was inaugurated, the purchaser was obliged to make an initial payment of at least one-third of the purchase price of the vehicle, plus the cost of insuring it fully. Subsequent payments were spread out over a period of twelve or eighteen months. Recently, however, many truck and bus makers have been financing time sales on a basis which obligates the purchaser to a substantially smaller amount with respect to his initial payment, and subsequent monthly payments are being permitted to run over a period of two years.

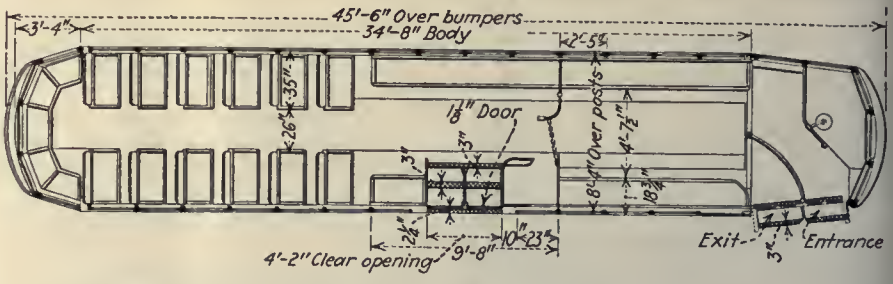
With competition keener than ever before in the history of the commercial vehicle industry, these repossessed machines are becoming an increasingly important problem with the manufacturers. In some instances the vehicles have been depreciated in value below the amount which has been paid on them, and in others the manufacturer is fortunate if he can turn the unit over again without a loss. This, of course, has an adverse effect upon new vehicle sales.

O. M. Edwards Furnishes Sash for Montreal Cars

It was stated in the issue of ELECTRIC RAILWAY JOURNAL for May 8, page 830, that sash fixtures on the 50 new cars being built by the Canadian Car & Foundry Company for the Montreal Tramways would be provided by the National Lock Washer Company. This statement is hereby corrected to read that the cars are entirely equipped with brass sash and fittings furnished by the O. M. Edwards Company. These cars and the sixteen cars for the British Columbia Electric Railway are said to be the first in Canada completely equipped with brash sash.

Fifty New Cars Will Aid with Sesqui Crowds





Delivery of 50 new streets cars recently ordered from the J. G. Brill Company by the Philadelphia Rapid Traction Company is expected to be made prior to June 1, according to an announcement by the car builders. The cars are of single-end construction and are destined to be placed in service to aid with the augmented traffic expected in Philadelphia during the Sesqui-Centennial Exposition. Specifications on the new units follow:

Weight:	
Car body	18,295 lb.
Trucks:	
Front	5,490 lb.
Rear	5,475 lb.
Equipment:	
Electric	6,100 lb.
Air brake	1,500 lb.
Total	36,940 lb.
Bolster centers, length	24 ft. 6 in.
Length over all	45 ft. 6 in.
Truck wheelbase	4 ft. 10 in.
Width over all	8 ft. 6 in.
Height, rail to trolley base	11 ft. 0⅜ in.
Body	Semi-steel
Interior trim	Statuary bronze
Headlining	Agasote
Roof	Arch
Air brakes	Westinghouse
Armature bearings	Plain
Axles	Carbon Steel
Bumpers	Channel type
Car signal system	Consolidated and Faraday
Car trimmings	Brill
Center and side bearings	Brill
Compressors	GE CP-27-A
Conduits and junction boxes	Brill galvanized iron junction boxes and Crouse-Hinds and Erie Malleable Iron Works condulets. Rigid iron conduits
Control	GE type K-68-A
Couplers	Pull socket and portable bar
Curtain fixtures	Curtain Supply Co. on 27 cars; National Lock Washer on 23 cars
Curtain material	Pantasote
Destination signs	Hunter
Door operating mechanism	National Pneumatic
Energy-saving device	Economy meter
Fenders	H-B lifeguard
Gears and pinions	Tool Steel
Hand brakes	Peacock staffless
Heater equipment	Consolidated
Headlights	Electric Service Supplies
Journal bearings	Plain
Journal boxes	Brill
Lightning arresters	GE type MD-3
Motors	GE-275-B, outside hung
Paint	Lucas
Registers	International
Sanders	Ohio Brass
Sash fixtures	Brill
Seats	Brill
Seating material	Wood slat
Springs	Brill
Step treads	Universal
Trolley catchers	Ohio Brass
Trolley bas	US-14
Trolley wheels	P.R.T. standard
Trucks	Brill 39-E-2
Ventilators	Garland C-1 Junior
Wheels	Rolled steel 28 in. and 22 in.
Special devices, etc.	"Promet" journal bearings

Changes in North East Service, Inc., Personnel

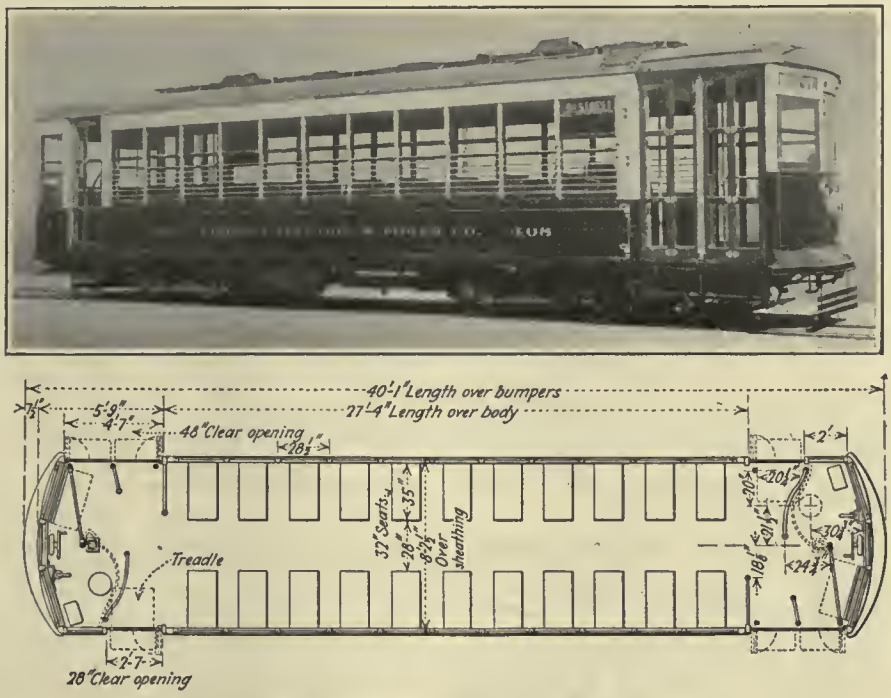
Warren K. Lee, manager of the North East branch at Detroit, has been appointed sales manager of North East Service, Inc., with headquarters at Rochester, N. Y. Mr. Lee joined the North East organization at Rochester in 1915. In 1916 he served with the American troops at the Mexican border as a member of the cavalry contingent of the New York State Militia. Upon his return he was appointed assistant manager of the Chicago branch, where he remained until the United States entered the war in 1917. Mr. Lee then joined the Engineering Corps with a lieutenant's commission and saw active duty in France. At the close of the war he was appointed manager of the Detroit branch, filling the vacancy left by R. J. Kelleher, who was at that time placed in charge of North East activities in Europe.

D. P. Cartwright has been appointed service manager of North East Service, Inc., with headquarters at Rochester, N. Y. Mr. Cartwright came into the North East organization in 1918 as manager of the New York branch. He continued in that capacity until 1925, when he was delegated to make a special trip around the world for the purpose of extending the activities of the North East Service organization in the Orient. For a number of years Mr. Cartwright was a director of the Automotive Service Association of New York. He was made a life member of the association at the time of his departure upon his trip.

W. C. Edwards, assistant manager of the North East branch at Chicago, has been appointed manager of the Detroit branch to succeed Warren K. Lee, who has just taken up his duties as sales manager of North East Service, Inc., at Rochester.

Trainload of Trolley Cars for Richmond, Va.

Seldom are the natives along the right-of-way of one of the country's railroads treated to the spectacle of a whole trainload of street cars being shipped hundreds of miles to their destination. Yet this sight was provided recently when the American Car Company of St. Louis, Mo., shipped a trainload of fifteen double-truck, double-end safety cars to the Virginia Railway & Power Company, Richmond, Va. Events such as this cannot have other than a most salutory influence upon public opinion, for they provide a very wholesome object lesson on the progressive spirit which is being increasingly shown within the industry. Upon arrival at Richmond the train occasioned much interest among the citizenry. The cars are now in service.



Exterior View and Floor Plan of the Richmond Cars

Specifications on the cars, which are of all-steel construction and capable of seating 44 passengers, are appended here:

Bolster centers, length	17 ft. 10 in.
Length over all	40 ft. 1 in.
Truck wheelbase	5 ft. 1½ in.
Width over all	8 ft. 5 in.
Height, rail to trolley base	11 ft. 0 in.
Body	All steel
Interior trim	Light colored mahogany
Headlining	Haskelite veneer ceiling
Roof	Arch
Air brakes	Westinghouse
Axles	Brill
Bumpers	Channel iron
Car signal system	Faraday
Car trimmings	Statuary bronze
Center and side bearings	Brill
Compressors	DH-16
Control	K-35
Curtain fixtures	National Lock Washer
Curtain material	Double-faced Pantasote
Destination signs	Hunter illuminated
Door-operating mechanism	American Car Co.
Enamel	Pratt & Lambert Vitralite
Energy-saving device	Economy meters
Fare boxes	Johnson
Fenders	H-B lifeguard
Gears and pinions	Westinghouse
Hand brakes	Peacock staffless
Heaters	Consolidated double-coil truss plank
Headlights	Ohio Brass type ZP
Journal boxes	Brill
Lightning arresters	Westinghouse
Motors	Westinghouse No. 508 inside hung
Sanders	American Car Co.
Sash fixtures	Schechter post casings, etc.
Seats	Brill Waylo
Seating material	"Friezette" plush
Springs	Brill
Step treads	Feralun
Trolley catchers	Ohio Brass
Trolley base	Ohio Brass
Trolley wheels	Ohio Brass
Trucks	Brill No. 177-E-1 friction bearing
Ventilators	Railway Utility double honeycomb
Wheels	Standard Rolled Steel Co. 26-in. diameter
Special devices, etc.	Root air-operated track scrapers



Fifteen Cars Being Delivered to Virginia Railway & Power Company

Customer	Number	Model
Public Service Transportation Co., Newark, N. J.	54	Gas-electric chassis
Tulsa Street Railway, Tulsa, Okla.	3	X, 21-passenger city service
Indianapolis Street Railway, Indianapolis, Ind.	3	Z, 29-passenger city service
United Electric Railways, Providence, R. I.	10	Z, 29-passenger city service
Wisconsin Power & Light Company, Fond du Lac, Wis.	1	Y, Parlor coach
	2	Z, 29-passenger city service
Nashville, Chattanooga & St. Louis Motor Transit Co., Nashville, Tenn.	3	Z, 29-passenger city service
Fifth Avenue Coach Company, New York, N. Y.	5	Y, Parlor coach
Key System Transit Co., Oakland, Cal.	3	X, 21 passenger city service
Joliet Transportation Co., Joliet, Ill.	1	Z, 29-passenger city service
Montreal Tramways, Montreal, Quebec, Canada	5	Z, 29-passenger city service
East St. Louis & Suburban Railway, East St. Louis, Ill.	4	Z, 29-passenger city service
Illinois Power & Light Corporation, Quincy, Ill.	2	X, 21-passenger city service
Illinois Power & Light Corporation, Galesburg, Ill.	2	X, 21-passenger city service
City Railway, Los Angeles, Cal.	1	Z, 29-passenger city service
Illinois Power & Light Corporation, Peoria, Ill	2	X, 21-passenger city service

101 Yellows Sold to Railways in April

For the month of April, the Yellow Truck & Coach Manufacturing Company reports deliveries of bus equipment to railway and traction companies as shown in the above table.

North Shore Cars Being Rushed

After a trial run, during which they attained a speed of 75 m.p.h., eight new all-steel passenger motor cars recently received by the Chicago, North Shore & Milwaukee Railroad at Highwood, Ill., from the Cincinnati Car Company have been pronounced satisfactory in every particular and are ready for service on the new Skokie Valley division, which will be opened about June 1.

The new equipment is part of an order placed last fall for twenty passenger cars and two dining cars. Delivery has been speeded up in order to have the additional equipment in service by June 24, when more than a million delegates to the International Eucharistic Congress are expected to entrain for Mundelein, Ill. The motors are being installed in the company's shops at Highwood as fast as the cars are received.

Rolling Stock

Chicago, North Shore & Milwaukee Railroad, Chicago, Ill., has received one six-cylinder type observation parlor car from the Fageol Motors Company of California.

Nashville Railway & Light Company, Nashville, Tenn., has just received one Differential car from the Differential Steel Car Company of Findlay, Ohio. This car is equipped with GE-275 motors and K control.

Metal, Coal and Material Prices

Metals—New York	May 25, 1926
Copper, electrolytic, cents per lb	13.80
Copper base, cents per lb	16.00
Lead, cents per lb	7.65
Zinc, cents per lb	7.20
Tin, Straits, cents per lb	61.00
Bituminous Coal f.o.b. Mines	
Smokeless mine run, f.o.b. vessel, Hampton Roads, gross tons	$4.425
Somerset mine run, Boston, net tons	1.925
Pittsburgh mine run, Pittsburgh, net tons	1.825
Franklin, Ill., screenings, Chicago, net tons	1.925
Central, Ill., screenings, Chicago, net tons	1.75
Kansas screenings, Kansas City, net tons	2.50
Materials	
Rubber-covered wire, N. Y., No. 14, per 1,000 ft	$6.25
Weatherproof wire base, N. Y., cents per lb	18.00
Cement, Chicago net prices, without bags	2.10
Linseed oil (5-bbl. lots), N. Y., cents per lb.	11.20
White lead in oil (100-lb. keg), N. Y., cents per lb	15.00
Terpentine (bbl. lots), N. Y., per gal.	$0.86

Victorian Railways, Melbourne, Australia, has received one six-cylinder parlor car chassis from the Fageol Motors Company of California.

Track and Line

Philadelphia, Pa.—One bid was received by the City Transit Department on May 21 for the contract for supplying the rails for the Broad Street subway and the contract was at once awarded. The single proposal was from the Bethlehem Steel Company, Bethlehem, Pa., and its offers for the 2,884 tons of rails, 205,000 spikes, nutlocks and bolts is $172,541. The third section of the rail equipment contract for the Broad Street subway is covered in a call to be issued for bids for the special trackwork in the Fern Rock terminal. The bids will be opened by Director of City Transit Ehlers on June 26. The advertised call for proposals enumerates rails, frogs, switches, crossings, tie-plates and all appurtenant equipment for the terminal. Call for the special trackwork, such as switches, crossovers, sidings and frogs for the main line is being advertised now, and these bids are to be opened on June 16. Contract for finishing the stations will soon be let.

Nashville Railway & Light Company, Nashville, Tenn., has been petitioned to extend its Buena Vista line across the Hydes Ferry bridge to Jordonia. The railway is willing to make the extension provided it is assured patronage sufficient to offset the expenditure.

Birmingham Electric Company, Birmingham, Ala., has been granted a franchise for a single-track car line on Twenty-first Street. The track will be utilized in rerouting East Lake cars.

Memphis Street Railway, Memphis, Tenn., has been engaged in many construction jobs, included in which is the improvement of Madison Avenue from Third Street to Marshall Avenue. The street is being widened to 49 ft. between curbs from Third Street to Lauderdale Street. The present wood block paving from Third to Fourth is being replaced by sheet asphalt. New 7-in. A.E.R.E.A. standard rail is being laid between Third and Piomingo Streets. The company recently completed overhauling the tracks on Thomas Street from the Union Railway crossing to the end of the line. Early in the present year the company began rebuilding the tracks on Fifth Street and on Sixth Street. New 7-in. A.E.R.E.A. creosoted ties and steel base plates are being installed. It is estimated that the work will take about two months to complete.

Power Houses, Shops and Buildings

Virginia Electric & Power Company, Richmond, Va., has started work on the construction of a modern bus terminal repair shop at the corner of Davis and Grayland Avenues. The new bus terminal, when completed, will represent an investment of approximately $20,000. It will be used as headquarters for the fleet of buses operated by the company in Richmond. Plans for the shop were designed by Allen J. Saville, Inc. This firm will also undertake the construction of a concrete building which will be 50 ft. x 140 ft. in dimension, a size adequate to handle the company's buses. The bus terminal will be used also as a repair shop and will be thoroughly equipped with machinery for undertaking all classes of repairs.

Trade Notes

H. B. Sauer has been appointed manager of the Detroit branch of Timken Roller Bearing Service & Sales Company. He was formerly assistant branch manager at Cleveland.

Samuel D. Hibben has been placed in charge of the combined engineering and illuminating department of the Westinghouse Lamp Company. Under his supervision will be grouped the commercial engineering department and the illuminating bureau, the consolidated activities to be known as a new commercial engineering department. His headquarters will be removed from 150 Broadway, New York, N. Y., to the company's plant at Bloomfield, N. J.

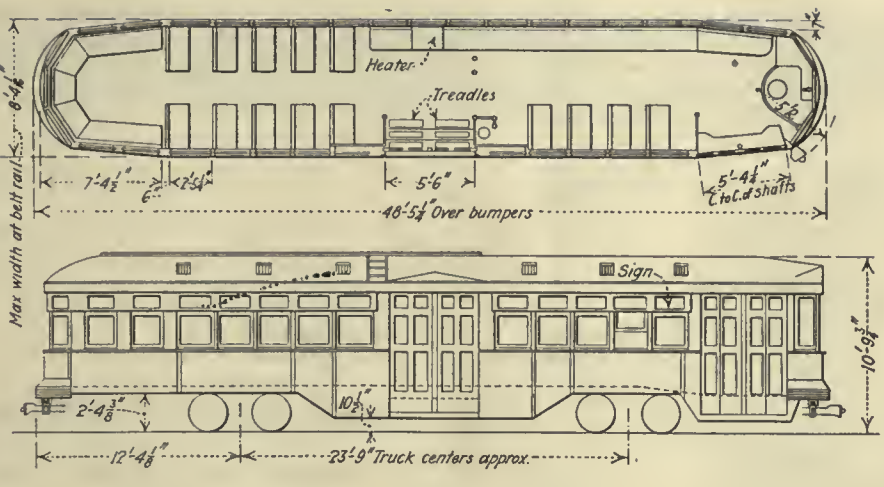
P. F. Rose, formerly assistant branch manager of the Timken Roller Bearing Service & Sales Company, has been appointed branch manager of its Cincinnati office.

Edward J. Doggins has joined the sales staff of the Eisemann Magneto Corporation, New York, N. Y. For the past four years he has acted as credit manager of the company and now covers the Southeastern territory. Stephen M. Cargill, Jr., succeeds Mr. Doggins as credit manager. Mr. Cargill was a former credit investigator for R. G. Dun's Commercial Agency.

New Advertising Literature

Sangamo Electric Company, Springfield, Ill., has issued a booklet giving instructions for the use of Sangamo D5 watt-hour meters.

Reo Motor Car Company, Lansing, Mich., has published a booklet which contains the editorials on bus operation which have appeared in back numbers of *Reo Bus News*. The foreword states that the book was prepared in response to many inquiries for these editorials, coming from various universities as well as engineering concerns. A number of editorials by Carl Parker are included giving pertinent suggestions as to the proper co-ordination of bus and railway service. Copies of this attractively edited booklet may be obtained from the Reo company.



Detroit figures on more cars!

Modern cars—of course
Peacock Staffless Brakes—of course!

The industry certainly is taking hold of the modern car idea. And rightfully so! It is putting the breath of new life into passenger receipts and revealing major economies in operating and maintenance costs.

Here is Detroit in the market for more of them. And like Detroit's other cars of recent years the Peacock Staffless Brake is an integral part of the equipment for insuring passenger safety.

National Brake Co., Inc.

890 Ellicott Sq., Buffalo, N. Y.

Canadian Representative:
Lyman Tube & Supply Company, Limited, Montreal, Canada.



Bankers and Engineers

Ford, Bacon & Davis
Incorporated
Engineers
115 Broadway, New York
PHILADELPHIA CHICAGO SAN FRANCISCO

The J. G. White Engineering Corporation
Engineers—Constructors
Oil Refineries and Pipe Lines, Steam and Water Power Plants, Transmission Systems, Hotels, Apartments, Office and Industrial Buildings, Railroads.
43 Exchange Place New York

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Incorporated
EXAMINATIONS REPORTS APPRAISALS
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***Consultant* on Fares and Motor Buses**
The Weekly and Sunday Pass—Differential Fares—Ride Selling
143 Crary Ave., Mt. Vernon, N. Y.

Transmission Line and Special Crossing Structures, Catenary Bridges
WRITE FOR OUR NEW DESCRIPTIVE CATALOG
ARCHBOLD-BRADY CO.
Engineers and Contractors SYRACUSE, N. Y.

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Specializing in Utility Rate Cases and Reports to Bankers and Investors
1017 Olive St., St. Louis, Mo.

THE P. EDWARD WISH SERVICE
50 Church St. NEW YORK — *Street Railway Inspection* DETECTIVES — 131 State St. BOSTON

When writing the advertiser for information or prices, a mention of the Electric Railway Journal would be appreciated.

NAUGLE POLES
WESTERN & NORTHERN CEDAR
NAUGLE POLE & TIE CO.
59 E. MADISON ST. CHICAGO ILL.
New York · Columbus · Kansas City · Spokane · Vancouver · Boston

"Axle Specialist Since 1866"
Address all Mail to Post Office Box 515, Richmond, Va.
CAR AXLES
J. R. JOHNSON AND CO., INC.
FORGED STEEL AXLES
For Locomotives, Passenger, Freight and Electric Cars
Smooth Forged or Rough Turned—Carbon or Alloy Steel—Plain or Heat Treated, Forged and Turned Piston Rods, Crank Pins, Large Shafts, Round Bars, etc.

ROEBLING
WELDING CABLE
ELECTRICAL WIRES and CABLES
John A. Roebling's Sons Company, Trenton, N. J.

A Single Segment or a Complete Commutator
is turned out with equal care in our shops. The orders we fill differ only in magnitude; small orders command out utmost care and skill just as do large orders. CAMERON quality applies to every coil or segment that we can make, as well as to every commutator we built. That's why so many electric railway men rely absolutely on our name.
Cameron Electrical Mfg. Co., Ansonia, Connecticut

BRAZED Rail Bonds ARC WELD
Portable Arc Welding Outfits
The Electric Railway Improvement Co.
Cleveland, Ohio

Northern CEDAR POLES Western
We guarantee
all grades of poles; also any butt-treating specifications
BELL LUMBER COMPANY
Minneapolis, Minn.



KALI

If you wish to murder your enemy by proxy in India—worship Kali, at the same time killing a goat, and calling it by your enemy's name during the ceremony.

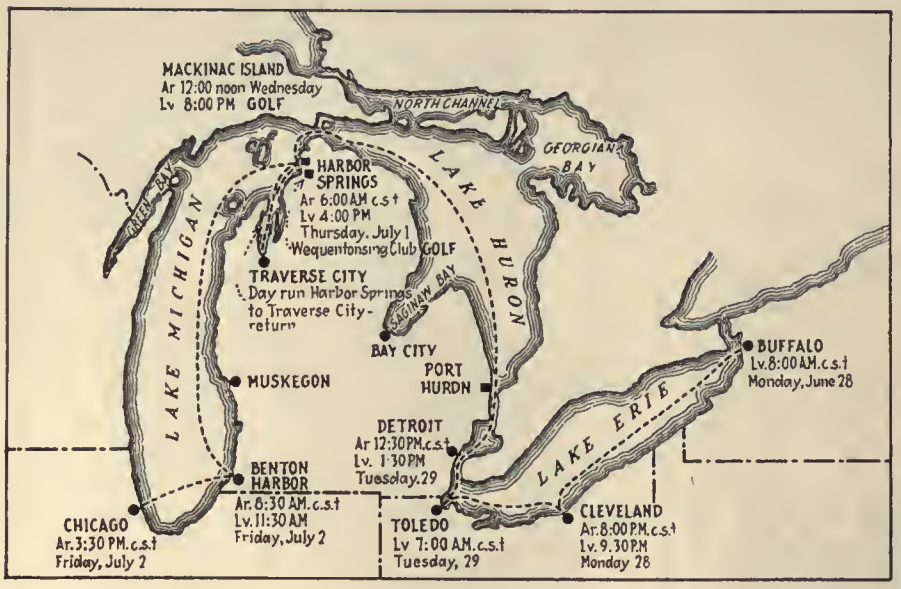
Getting rid of anything you hate is the finest kind of business—especially the misapplied carbon brushes that get your goat and money.

They're the enemy of good commutation.

The way to do it is to kill the requisition that specifies such brushes—making out a new one in the name of Morganites.

They'll be friendly for life.

Morganite Brush Co., Inc.
Main Office and Factory
519 West 39th St., New York
DISTRICT ENGINEERS AND AGENTS
Pittsburgh, Electrical Engineering & Mfg. Co., 909 Penn Ave.
Cincinnati, Electrical Engineering & Mfg. Co., 607 Mercantile Library Building.
Cleveland, Electrical Engineering & Mfg. Co., 422 Union Building.
Baltimore, O. T. Hall, Sales Engineer, 437-A Equitable Building.
Revere, Mass., J. F. Drummey, 75 Pleasant Street.
Los Angeles, Special Service Sales Co., 502 Delta Building.
San Francisco, Special Service Sales Co., 202 Russ Building.
Toronto, Can., Railway & Power Engineering Corp., Ltd., 101 Eastern Ave.
Montreal, Can., Railway & Power Engineering Corp., Ltd., 326 Craig St., West.
Winnipeg, Can., Railway & Power Engineering Corp., Ltd., P. O. Box 325.





A Cruise of business
Pleasant Companionship
and Recreation

Central Electric Railway Association

SUMMER MEETING

June 28th to July 2nd

Combines all of the above in its instructive meetings aboard the ship, its friendly gatherings on the decks, its golf at Mackinac and Harbor Springs and its bathing at Mackinac.

The Ship The South American

The finest cruising Steamer on

The Great Lakes



Arch Rock at Historic Mackinac Island

The time most convenient

Starting from Buffalo Monday morning, June 28th, from the Lackawanna Dock foot of Main Street at 8 o'clock Central Standard Time, nine o'clock Eastern Standard time.
From Cleveland the same evening at 9:30 C.S.T.
From Toledo Tuesday morning at 7:00 C.S.T.
From Detroit Tuesday afternoon at 1:30 C.S.T.
At Mackinac Island Wednesday from noon until evening for golf, bathing and sight-seeing.
At Harbor Springs Thursday morning for golf for the golfers for others a cruise in Traverse Bay.
Reach Benton Harbor Friday morning shortly after breakfast time and Chicago at 3:30 in the afternoon.



Old Fort at Historic Mackinac Island

Costing only $40.00 for a five-day cruise, Buffalo to Chicago, including meals and berth—slightly less from Cleveland, Toledo or Detroit

All Electric Railway men invited. For information, reservations and tickets write

JOHN BENHAM, Vice President
The International Register Co., 15 South Throop Street, Chicago, Ill.

GET YOUR RESERVATIONS IN EARLY

To Standardize or Not to Standardize

Railway operators buy standard equipment but they do not buy from standard salesmen. It takes *individuality* to sell and if the manufacturer's representatives all wore a standard uniform and told the same story, in the same tone of voice, they would surely fail to interest you.

Advertising, like selling, should be individualized rather than standardized. Yet advertisers in the railway field are inclined to follow standard formulae.

Why should this be so? The equipment salesmen do not feel this way. Nor do advertisers in other fields.

Most people, in fact, actually *enjoy* reading the advertisements in a general magazine. You turn to them perhaps before you turn to the regular stories and articles and this is solely because they are humanized rather than formularized and unusual rather than uniform.

There is little standardization, for instance, in the advertising pages of the Saturday Evening Post or of your Sunday Newspaper. Here are advertisements launched with highest hope and conviction that business will result. They are vital, living advertisements, widely varying in nature and appeal.

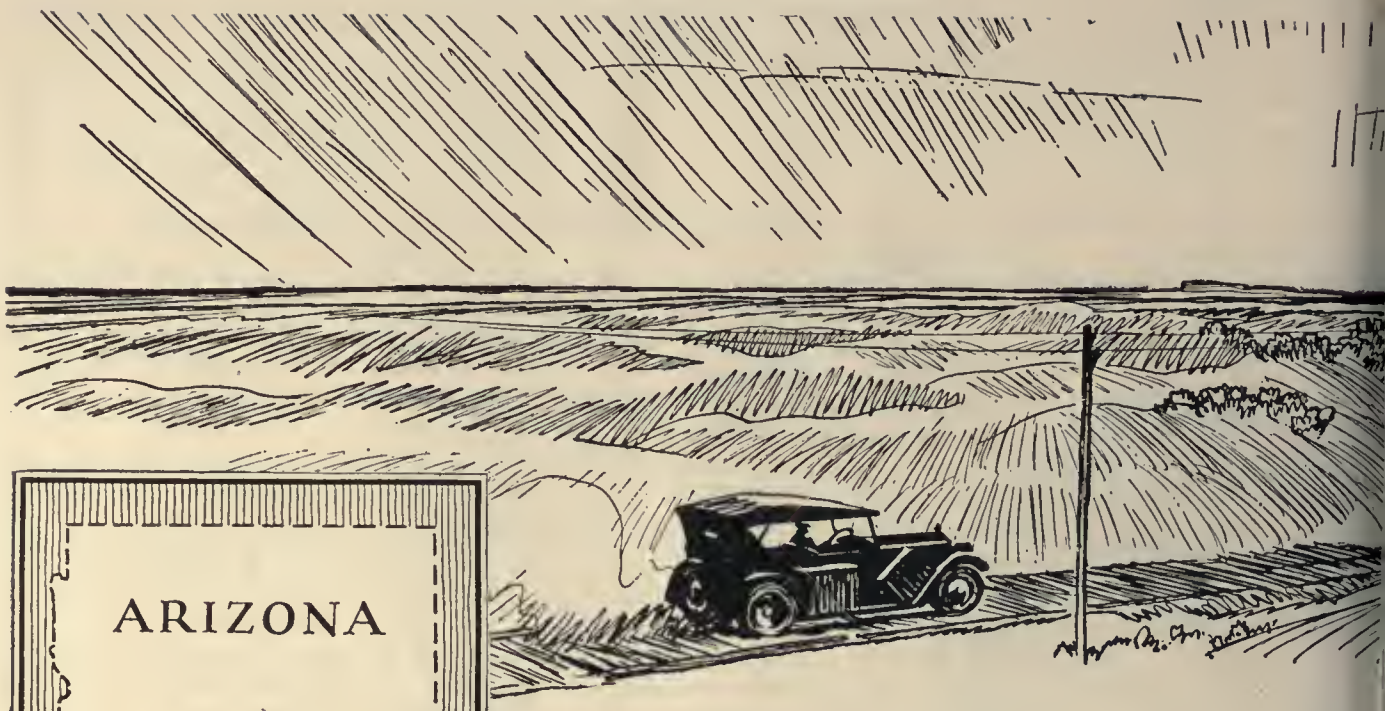
Is not transportation equally vital? Cannot the discussion of a field coil or axle bearing be made just as interesting as the discussion of an ice box or electric toaster? We believe that it can, for advertising is not a standardized procedure. It is an open sea of sales promotion possibilities and any number of effective courses can be followed to produce results.

In transportation work, of course, these courses must be followed with true knowledge of the industry's problems. We are specialists in transportation advertising and, in advertisements which bear our lighthouse trade mark, we have tried to combine true understanding of the industry's requirements with a variation in appeal, an individuality in presentation and a touch of human interest which secures a reading and promotes response.



Doyle, Kitchen & McCormick, Inc.
2 WEST 45th STREET, NEW YORK

An Advertising Agency



Blazing a Trai

Across a hundred miles of desert

~following the winding trail along wind-swept sand dunes~over corduroy roads~

Puffed and chugged an automobile

IT was taking a McGraw-Hill field man across the Yuma Desert to the only spot in Arizona at which there was a generating station, with as much as 1000 kw. capacity, where a McGraw-Hill Publication was not received and read.

He got his man and back came the laconic report, "Pull that red tack off the map!" . . . . . And out it came.

Red tacks, representing uncovered plants, are getting fewer and fewer on the big map in the McGraw-Hill Publications offices. One by one they come out as McGraw-Hill men, located in every state in the Union, visit the important industrial plants.

A recent analysis of subscriptions to McGraw-Hill Publications in Erie County, N. Y., shows that 80% of industrial buying power in that district is covered—100% in some industries. Erie County is a typical sample of McGraw-Hill circulation throughout the country.

Accepting the responsibility which goes with leadership, McGraw-Hill Publications recognize an obligation to cover their respective fields. Every worth while unit of industry, regardless of location, is a prospect and must be sought regardless of cost.

Your Prospects as well as Ours

The manufacturer selling to industry is striving to make customers of precisely these same units.

The McGraw-Hill Publications

MINING
ENGINEERING & MINING JOURNAL-PRESS
COAL AGE

ELECTRICAL
ELECTRICAL WORLD — JOURNAL OF ELECTRICITY
ELECTRICAL MERCHANDISING

INDUSTRIAL
AMERICAN MACHINIST — INDUSTRIAL ENGINEER
CHEMICAL & METALLURGICAL ENGINEERING
POWER

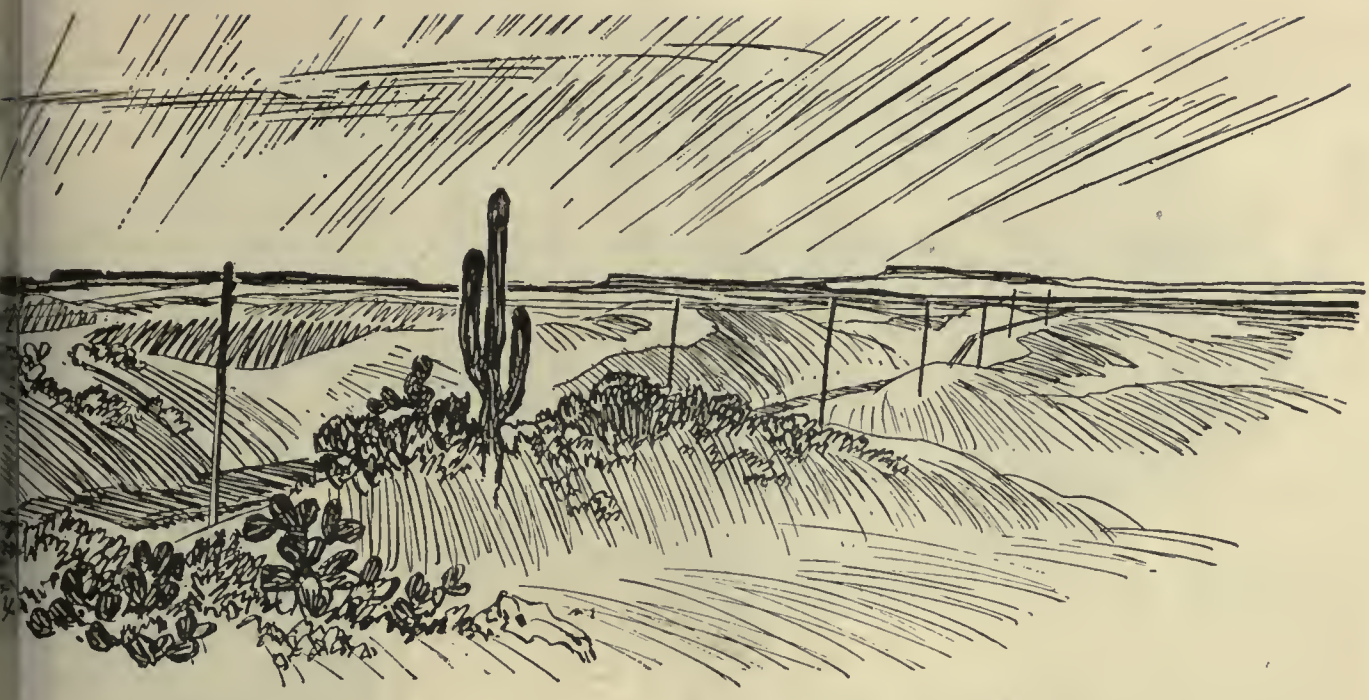
CONSTRUCTION & CIVIL ENGINEERING
ENGINEERING NEWS-RECORD
SUCCESSFUL METHODS

TRANSPORTATION
ELECTRIC RAILWAY JOURNAL
BUS TRANSPORTATION

RADIO
RADIO RETAILING

OVERSEAS
INGENIERIA INTERNACIONAL
AMERICAN MACHINIST
(European Edition)

CATALOGS & DIRECTORIES
ELECTRICAL TRADE CATALOG — RADIO TRADE CATALOG
KEYSTONE CATALOG (Coal Edition) — KEYSTONE CATALOG (Metal-Quarry Edition)
COAL CATALOG — COAL FIELD DIRECTORY
ELECTRIC RAILWAY DIRECTORY
CENTRAL STATION DIRECTORY
ANALYSIS OF METALLIC AND NON-METALLIC MINING, QUARRYING AND CEMENT INDUSTRIES



to your Customer's Door!

We know they are the same, for they are industry's real buyers. The list of their names is an industrial directory of America. McGraw-Hill records and analyses, compiled through years of research, show the physical rating of the individual plants and their purchasing power.

Subscribers are hand picked in advance on the basis of the positions they fill, from corporation president to the key men responsible for operation and production . . . . . the men who influence or control purchases.

Is your own selling, or your client's selling to these prospects based on pre-analysis of the market . . . . . on accurate knowledge of buying power . . . . . on waste-free selling effort, which result when the *McGraw-Hill Four Principles of Industrial Marketing* are applied? These principles, upon which McGraw-Hill subscriptions are built, are:

MARKET DETERMINATION — An analysis of markets or related buying groups to determine the potential of each. With a dependable appraisal of each market, selling effort can be directed according to each market's importance.

BUYING HABITS—A study of the selected market groups to determine which men in each industry are the controlling buying factors and what policies regulate their buying. Definite knowledge eliminates costly waste in sales effort.

CHANNELS OF APPROACH — The authoritative publications through which industries keep in touch with developments are the logical channels through which to approach the buyer. In a balanced program of sales promotion these publications should be used effectively and their use supplemented by a manufacturer's own literature and exhibits.

APPEALS THAT INFLUENCE—Determining the appeals that will present the product to the prospective buyer in terms of his own self-interest or needs.

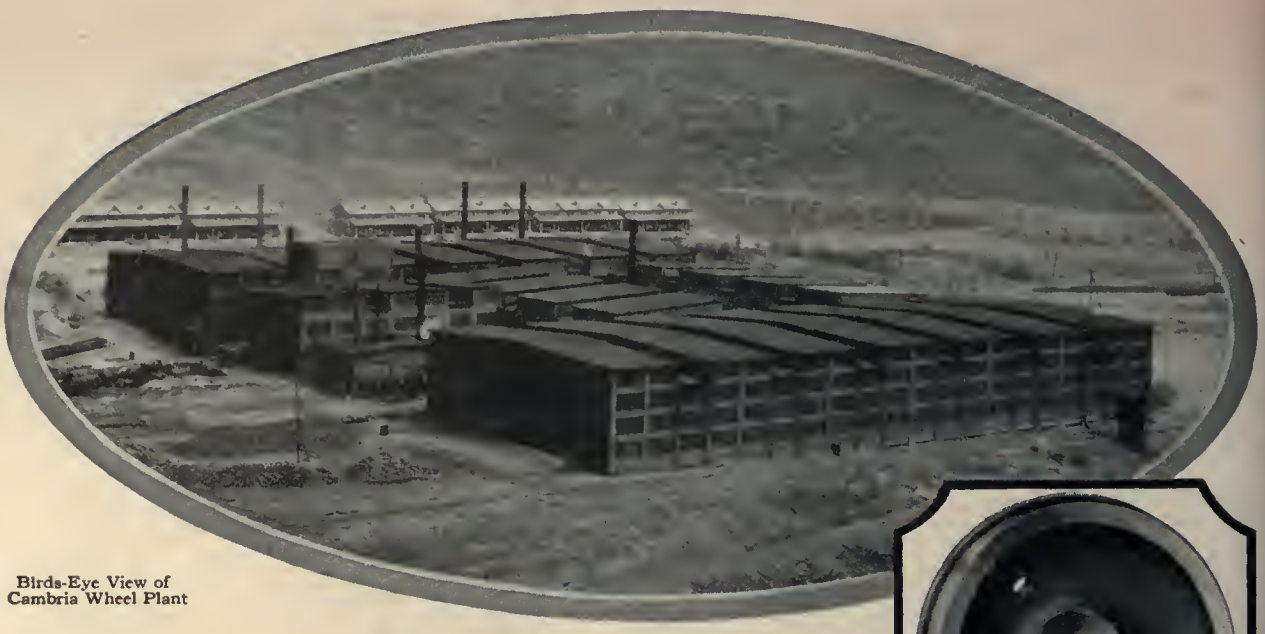
We offer to industrial manufacturers everywhere the fruits of our accumulated experience in evolving, proving and applying these Four Principles. At each of the McGraw-Hill offices are Marketing Counselors who will be glad to lay complete data before you or your advertising agent. You can communicate with our nearest office and arrange a consultation, when and where you please,

70 salaried circulation field men cover industry in every state in the Union.
They travel 500,000 *miles a year.*
220,000 *subscribers pay for* 10,000,000 *copies of McGraw-Hill Publications yearly.*
50,000 *McGraw-Hill subscribers change their addresses each year, and tell us so.*
Only 1 *out of every* 7,800 *copies of McGraw-Hill Publications mailed is returned by P. O. Dept. for better address.*
In a year's period 18,000 *paid subscribers obtained for Radio Retailing, a record in business paper publishing.*

GRAW-HILL PUBLISHING COMPANY, INC., NEW YORK, CHICAGO, PHILADELPHIA, CLEVELAND, ST. LOUIS, SAN FRANCISCO, LONDON

Mc GRAW-HILL PUBLICATIONS

45,000 Advertising Pages used Annually by 3,000 manufacturers to help Industry buy more effectively.



Birds-Eye View of Cambria Wheel Plant

Forged *then* Rolled —*to Give Longer Life*

Cambria Wheels are made by a combined forging and rolling process which gives them great durability and an exceptionally long life.

The forging process gives strength, toughness and density to the metal, while the rolling establishes a grained structure which prevents breakage and crystallization.

Long experience in the manufacture of wheels and control over materials assure you of a product of the highest quality and finest workmanship.

Cambria Forged Car Axles



Cambria Car Axles are made of the same fine quality as Cambria Wheels and can be furnished smooth forged or rough turned all over; solid or hollow bored; rough turned on journals and wheel seats; heat treated or untreated.

A Few Bethlehem Railway Products

for Electric Railways include Tee and Girder Rails; Machine Fitted Joints; Splice Bars; Hard Center Frogs; Hard Center Mates; Rolled Alloy Steel Crossings; Abbott and Center Rib Base Plates; Rolled Steel Wheels and Forged Axles; Tie Rods; Bolts; Tie Plates and Pole Line Material.

BETHLEHEM STEEL COMPANY, *General Offices:* BETHLEHEM, PA.

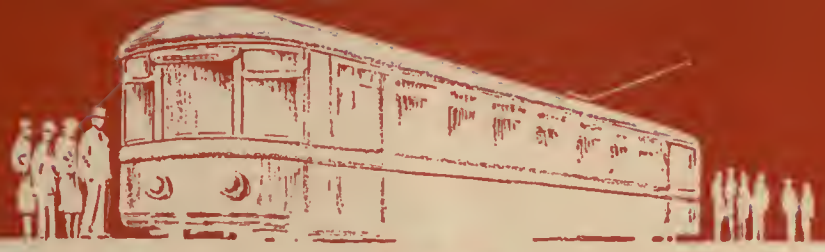
DISTRICT OFFICES

New York Boston Philadelphia Baltimore Washington Atlanta Pittsburgh
Buffalo Cleveland Detroit Cincinnati Chicago St. Louis San Francisco Seattle Los Angeles

Bethlehem Steel Export Corporation, 25 Broadway, New York City, Sole Exporter of our Commercial Products

BETHLEHEM

CAMBRIA CAR WHEELS AND AXLES



Grand Rapids Sets the Pace!

in modernizing their equipment

They wanted a car of character!—a car built to new and unusual specifications,—one that would impress the Grand Rapids public with the fact that the obsolete type of car was being discarded. They wanted a car that would have all the comfort and convenience of the automobile, yet without the disadvantages of the automobile.

They wanted a car that would be unusually attractive, with stream-line body, a beautiful distinctive finish and appointments that would add to the convenience and riding comfort of passengers. They wanted a low floor, steps spaced comfortably, wide aisles, comfortable seats and clear vision windows.

The operating features had to be equally modern. Single end operation, special noiseless trucks, quick acceleration, efficient braking, low energy consumption, and all the modern safety features.

After conceiving this modern day car they called it their *"Electric Motor Coach"* and had "St. Louis" build it.

Again "St. Louis" pioneers and "Quality" cars lead.

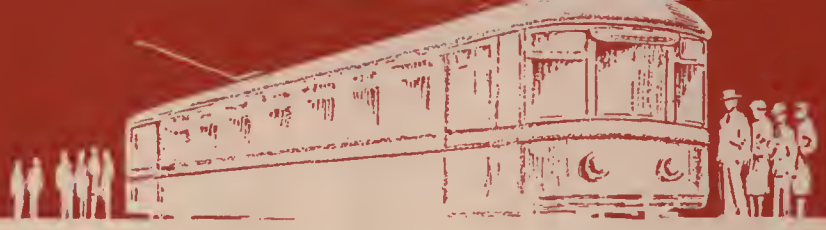


built by—

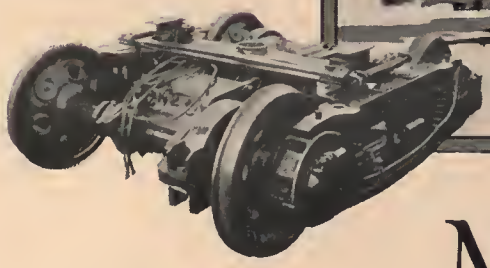
St. Louis Car Co.

St. Louis, Missouri

St. Louis Cars







In St. Louis E.I.B. trucks, no effort has been spared to produce balanced lightness, with adequate strength, plus quietness, riding comfort and smoothness of operation hitherto not attained in street railway operation.

The equalizers are so designed that roller bearings or plain bearings can be used *without changing the journal box. This is the first type of truck so constructed and a distinct advance in truck engineering.*

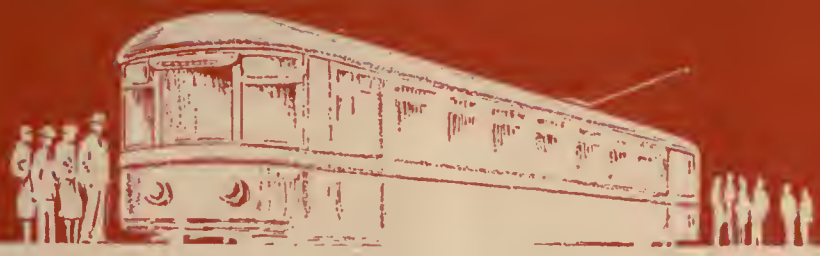
MODERN *appearance*

THESE new cars are attractive to look at. You will agree to that when you see them. Even the color combinations are pleasingly different. The lines are unbroken—stream line in effect. The panels are smooth, with no rivets showing. The belt rail is continuous. There are double headlights, practical as well as pleasing to look at, an automobile type of bumper front and rear, a large adjustable one-piece windshield. There is a sun visor over the windshield and a concealed flood light over the dash. There is an automobile type stop-light and there are step lights for both front and rear doors. The skirt is hinged —a splendid arrangement that adds to the stream line appearance of the car and at the same time provides easy accessibility.

built by—

St. Louis Car Co.

Quality Cars





Notice the studied tilt of these comfortable individual seats. They are made with coil springs and are of the double cushion air type. Width over all 36-in. Designed and built by St. Louis Car Co.



MODERN *comfort*

TO SEE the interior of this car is to appreciate its appeal to a comfort loving public. Wide aisles, large attractive dome lights, bright cheerful rubber tiling on the floor, and panelling of rich mahogany.

The seats are unusual—Full leather upholstery, deep luxurious seat cushions, form-fitting individual backs, tilted to insure maximum comfort. They were *built* by the St. Louis Car Company and are, we believe, unexcelled for comfort, good taste and beauty of design.

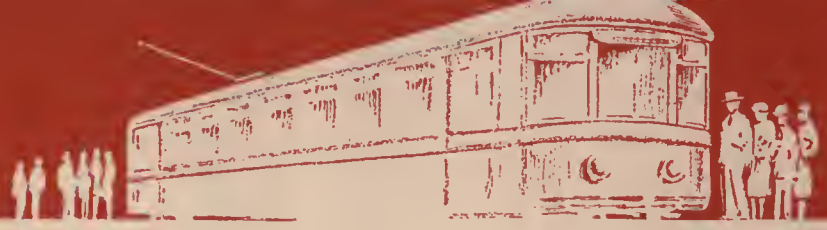
There is a Club smoking compartment in the rear, with an exit door operated by an automatic step treadle.

Grand Rapids cars represent a combination of practical utility with beauty, good taste with enduring car construction, speed with safety and economy of operation that cannot fail to secure the enthusiastic endorsement of the riding public.

built by—

St. Louis Car Co.

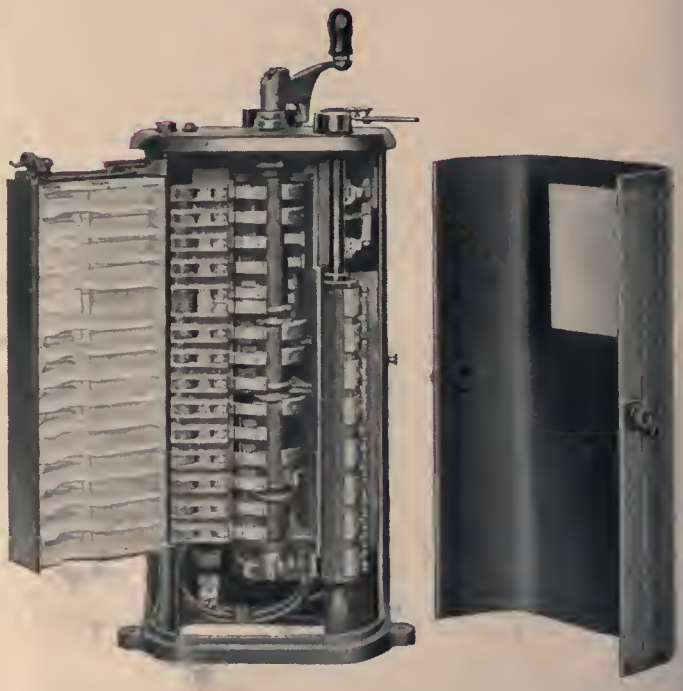
Quality Cars



Stepping up the speed—



K-35 single-end Control with G-E Line Breaker

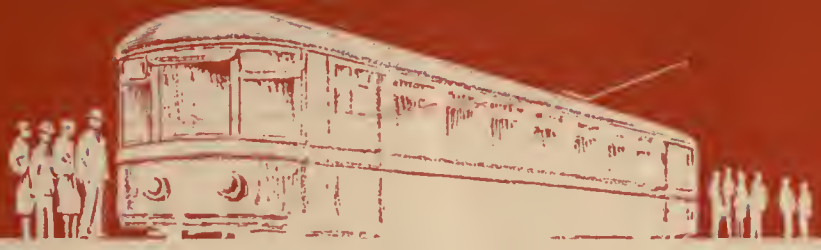


The modernization of rolling stock is the biggest single problem before the industry. The cooperation of General Electric is offered for the development of any improvement or the production of any electrical equipment necessary to carry out a program of modernizing equipment. Many instances can be cited in which modern G-E equipped cars have achieved notable savings or developed new sources of revenue.

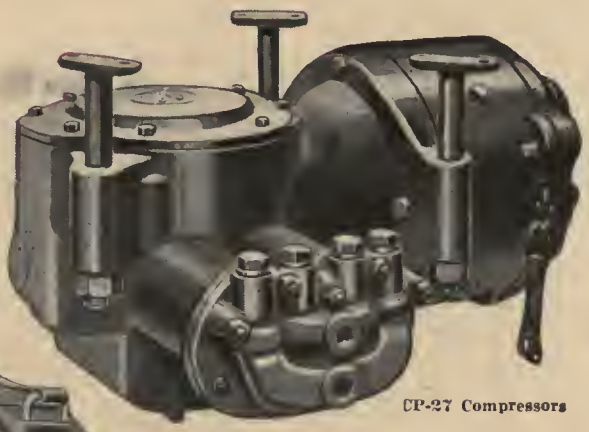
SINCE the A.E.R.A. Convention exhibits last fall, all eyes have been focussed on the Grand Rapids Railway's experiment in transportation. This road, departing radically from established precedent, introduced cars designed primarily to attract patronage and promote public good will.

The facts obtained at Grand Rapids with the three original model cars, which developed a schedule speed of 9.5 miles per hour, showed that energy consumption could be reduced 41%, and passengers per car-mile increased nearly 63%. This was proof enough that modern cars pay.

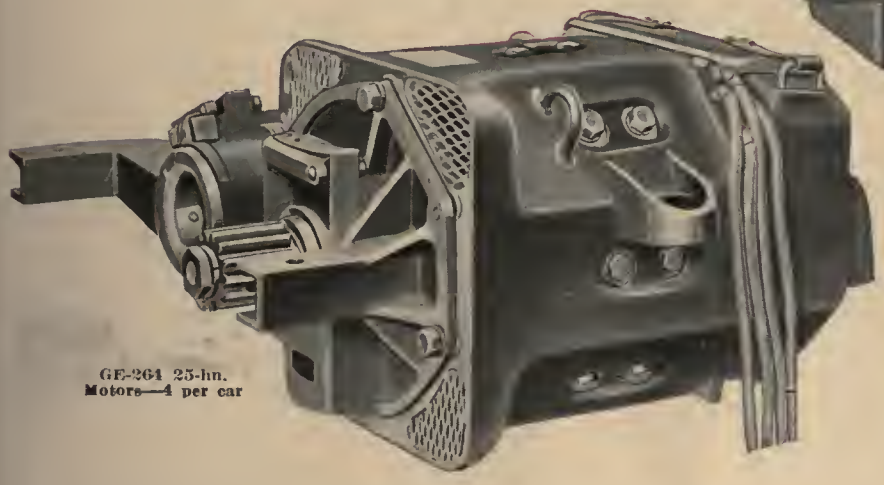
GENERAL



stepping down the costs



CP-27 Compressors



GE-264 25-hn.
Motors—4 per car



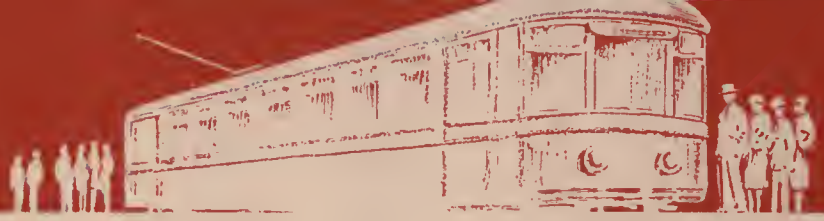
G-E Non-resonant Gears—
for 23 of the 27 cars

The success of this practical experience with ultra-modern light-weight rolling stock again establishes the success of General Electric modern car equipment, which was furnished for two of the trial cars and which was specified for all of the 27 new cars for the Grand Rapids property.

Even more significant is the fact that here is an instance of a large holding company which sees the advantage of standardization of car design and which is proceeding toward complete modernization of the car equipment operated by its many properties in the Middle West and South.

330-26

ELECTRIC



DAVIS "One-Wear"

The economy, and the sound principles of design embodied in the Davis "One-Wear" Steel Wheel, have led to their choice as part of the modern cars.

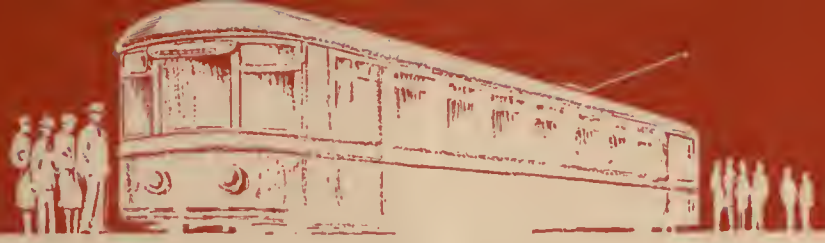
In these days of specialization on service, the elimination of maintenance becomes the deciding factor in the selection of equipment.

The Grand Rapids Railway Company in their quest for the ultra modern car, have adopted the Davis "One-Wear" Steel Wheel as standard equipment, chiefly because of their safety, lightweight and wear resisting qualities.

AMERICAN STEEL FOUNDRIES

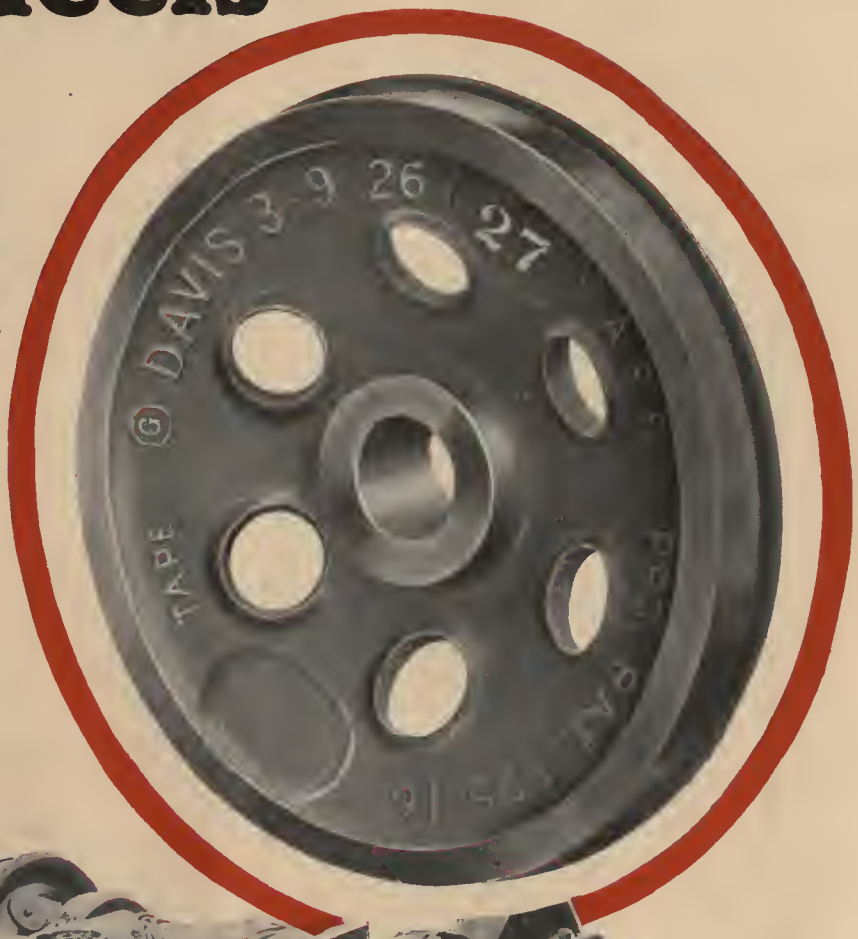
NEW YORK CHICAGO ST. LOUIS

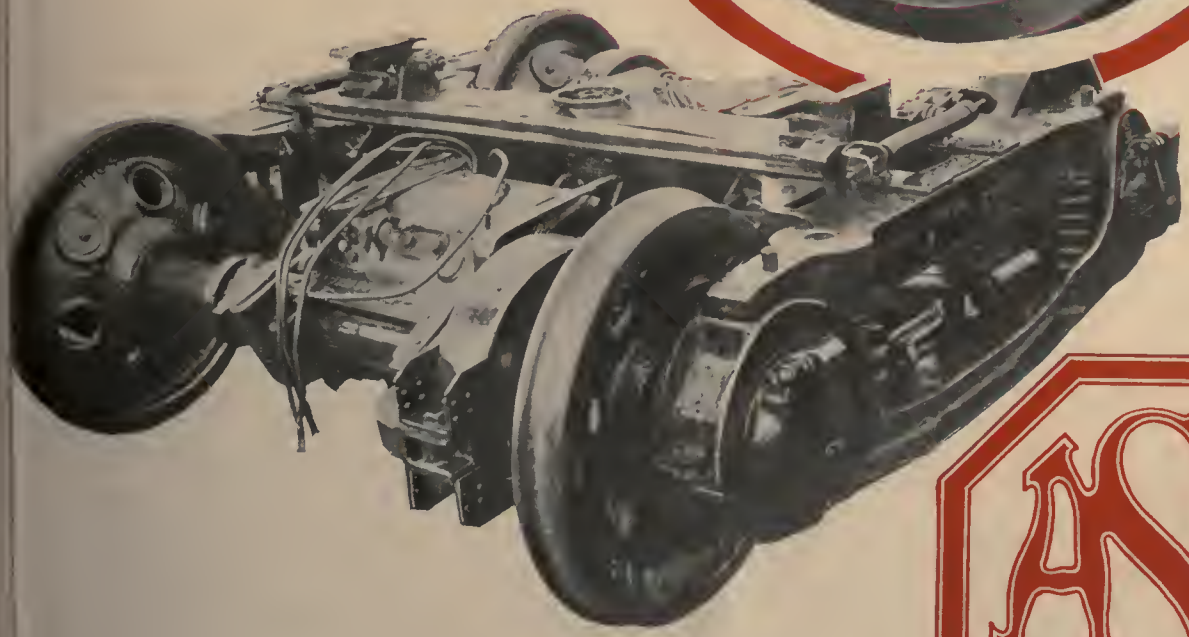




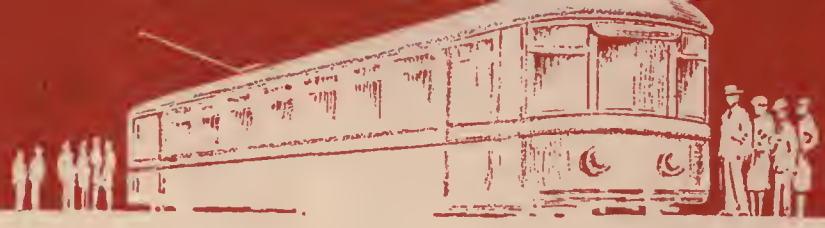
Steel Wheels

The Davis "One-Wear" Steel Wheel is a high manganese composition wheel, heat treated to offer maximum resistance to wear.





ASF





Every one of the new Grand Rapids cars will be a "Safety" car

Every one of them is fully equipped with Safety Car Control Devices,—simple in operation, yet assuring positive control and constant efficiency. For experience has shown in Grand Rapids as elsewhere that car safety is a fundamental and powerful factor in building up that public confidence and goodwill essential to successful operation under modern conditions.

The "Safety" Car cannot be moved or the brakes released until the doors are closed, neither can the doors be opened until the brakes are applied.

If the operator releases the controller handle due to carelessness or disability, the power is shut off, the track sanded, an emergency brake application made and the doors unlatched ready for exit of passengers.

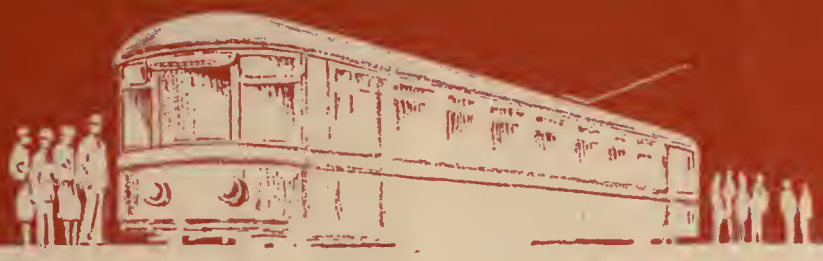


SAFETY CAR DEVICES CO.
OF ST. LOUIS, MO.

Postal and Telegraphic Address:
WILMERDING, PA.

CHICAGO SAN FRANCISCO NEW YORK WASHINGTON PITTSBURGH

It is a safety car if equipped with our standard Safety Car Control Devices



Economy Meters



on new Grand Rapids cars

will assure maximum possible savings

Records kept of the operation of the Grand Rapids original experimental cars showed an energy consumption of 1.82 kw.-hrs. per car mile, as compared with 2.65 on the entire system, or 32% reduction.

Grand Rapids expects the 27 new cars to help pay for themselves by this large reduction in power. Grand Rapids intends to run every one of them, all the time, with the least possible expenditure of power. Grand Rapids desires every operator to do his part.

To that end, ECONOMY METERS are being installed on all these cars, so that actual performance can be checked. Failure to operate efficiently will be made apparent at once, and the cause, whether human, mechanical or electrical, can be corrected. New Modern cars can save energy—ECONOMY METERS make sure of it!

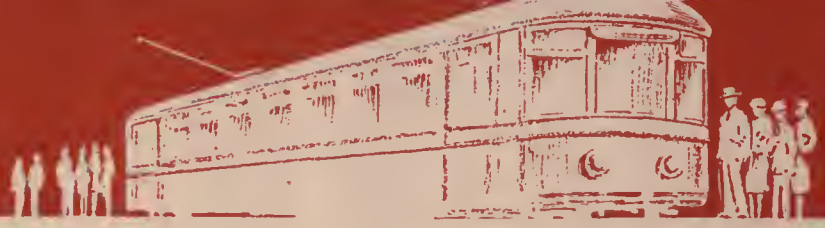
All the Grand Rapids Cars, new and old, have ECONOMY METERS.

Economy Electric Devices Company

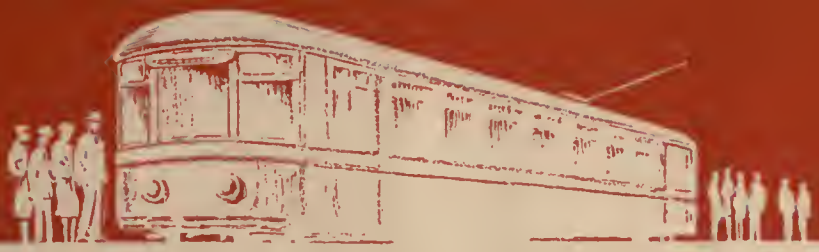
37 W. Van Buren St., Chicago

Distributors or Agents for

Sangamo Economy Meters
Peter Smith Heaters
Woods Fare Boxes
Bemis Boyerized Truck Specialties




DIVISION
2



Two Headlights for a single end car!



O-B HEADLIGHTS

Type WDB "Imperial" headlights are used. Furnished with McKee lens.



O-B TROLLEY CATCHER

The standard trolley catcher for city service. Has "anti-step-up" feature



O-B FORM 1 TROLLEY BASE

Combines light weight and construction features that insure uniformly a tisfactory operation.

THAT'S a unique idea, isn't it? Yet it's a perfectly logical one, intended to put the street car on an even footing with the automobile, both as to appearance and as to safety.

But when it came to the choice of equipment—time-tried standards prevailed, and O-B "Imperial" Headlights were the choice.

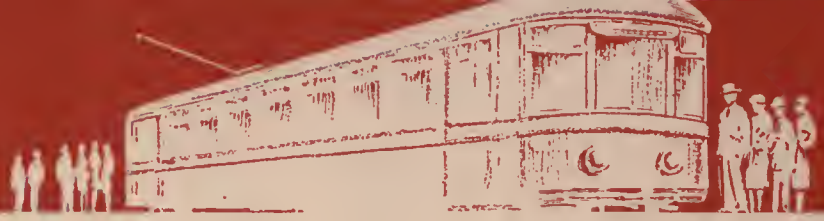
Trolley Base and Trolley Catchers too, are standard O-B types.

Ohio Brass Company, Mansfield, O.
Dominion Insulator & Mfg. Co., Limited
Niagara Falls, Canada

115 C

Ohio Brass Co.

PORCELAIN INSULATORS LINE MATERIALS RAIL BONDS CAR EQUIPMENT MINING MATERIALS VALVES



In Grand Rapids

YOU SEE THIS PAINT ON ALL STREET CARS

For the past two years all the Street Cars of Grand Rapids have been painted with

Johnston's Krakno Enamel System



Striking vivid color combinations that you see today on the new cars were planned and worked out in detail by Louis J. De Lamarter, assisted by other officials of The Grand Rapids Railway Co., working with Leon L. Wolf, Railway Sales Manager.

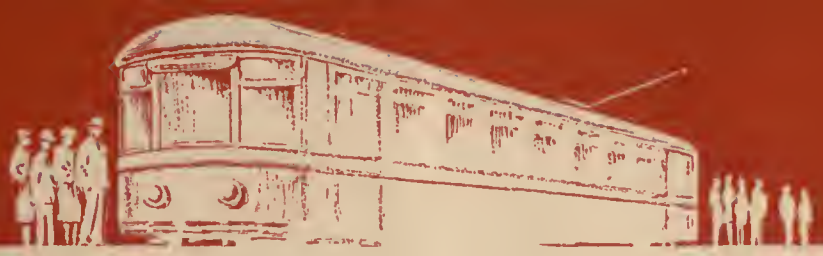
When you see driving rain or burning sun streaming down upon the Roofs of the Street Cars, just remember that they are capably protected by

JOHNSTON'S ROOF ENAMEL

Manufactured by

The R. F. Johnston Paint Co.

Pearl and Main Streets — Cincinnati, Ohio



Keystone



is written on another record!

- Hunter-Keystone Signs
- Faraday Car Signals
- Keystone Rotary Gongs

The experiments carried on by the Grand Rapids Railway proved conclusively that improved appearance and increased comfort were all-important factors in inducing the public to ride more.

It is therefore significant that these new cars will use Hunter-Keystone Signs and Faraday Car Signals to attract increased patronage—which means increased revenue—and Keystone Rotary Gongs to make operation safer by means of the distinctive warning which they produce, to compete with modern street noises.

Let us tell you how other progressive electric railways are using Keystone Car Equipment to sell their service to the public.



Hunter-Keystone Destination Signs fit practically any space available on a car. See Catalog No. 7 for various types.

Faraday Car Signal Systems are made for every requirement. See Catalog No. 7 for different types and sizes.

Keystone Rotary Gongs provide an effective alarm bell even on the noisiest streets. See Catalog No. 7 for full particulars.

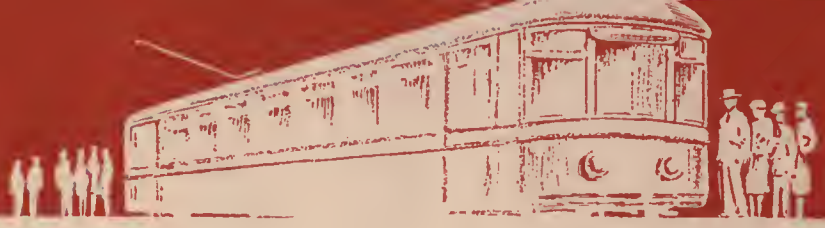
ELECTRIC SERVICE SUPPLIES CO.

PHILADELPHIA 17th and Cambria Sts — NEW YORK 50 Church St. — CHICAGO Illinois Merchants' Bank Bldg.

PITTSBURGH 1123 Bessemer Building — SCRANTON 316 N. Washington Ave. — DETROIT General Motors Building

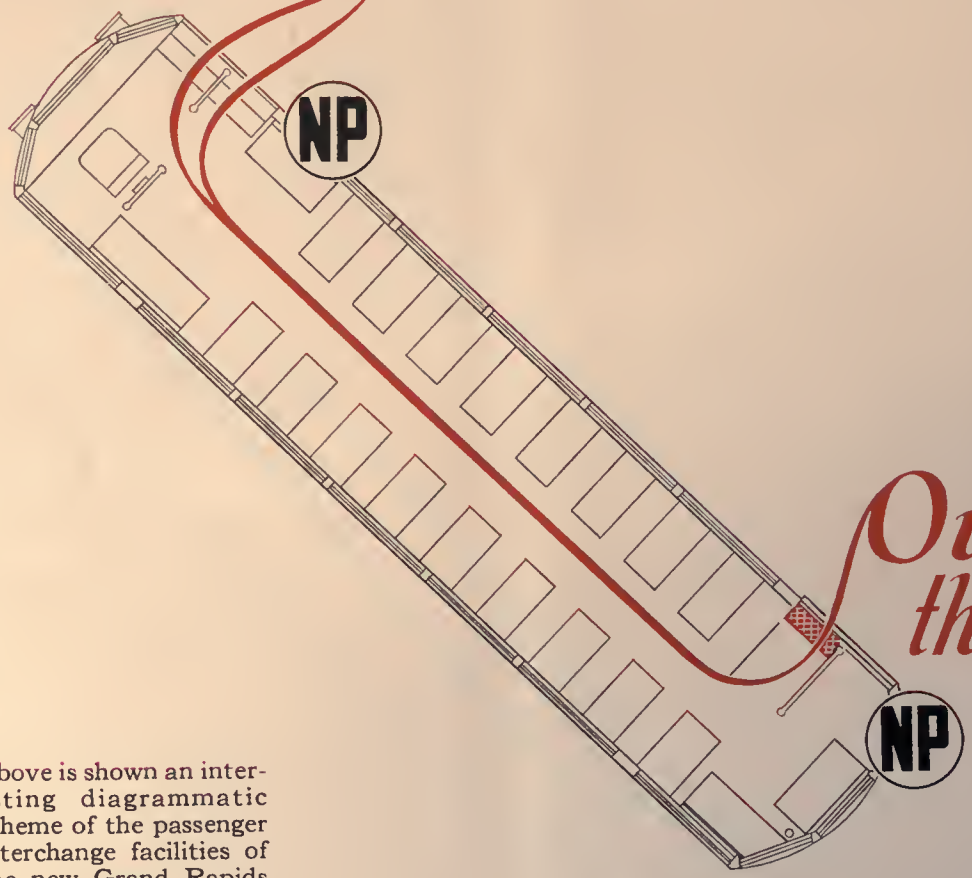
BOSTON, 88 Broad St.

Lyman Tube & Supply Co., Ltd., Montreal, Toronto, Vancouver



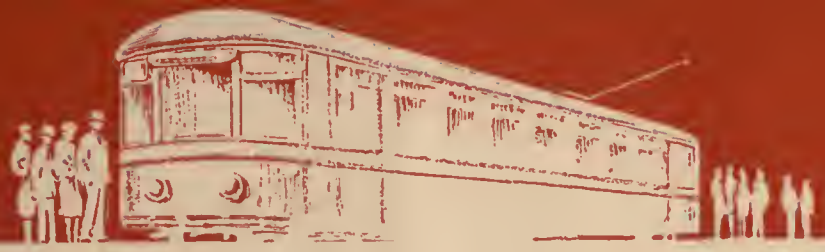
Grand Rapids speeds up.

In the front



Out the back

Above is shown an interesting diagrammatic scheme of the passenger interchange facilities of the new Grand Rapids cars. National Pneumatic Equipment at front and rear doors is included, of course.



and Specifies the **Treadle**



BOTH front and rear doors of the new Grand Rapids cars are operated by National Pneumatic Equipment.

The door is opened by the weight of a passenger on the treadle. The safety interlock, however, prevents this opening of the doors until the car has come to a dead stop.

When the last passenger is off the step, the door closes and a light flashes before the operator, in front. The same safety interlock prevents the car from starting before the doors are tightly closed and the signal light has flashed.

NATIONAL PNEUMATIC COMPANY

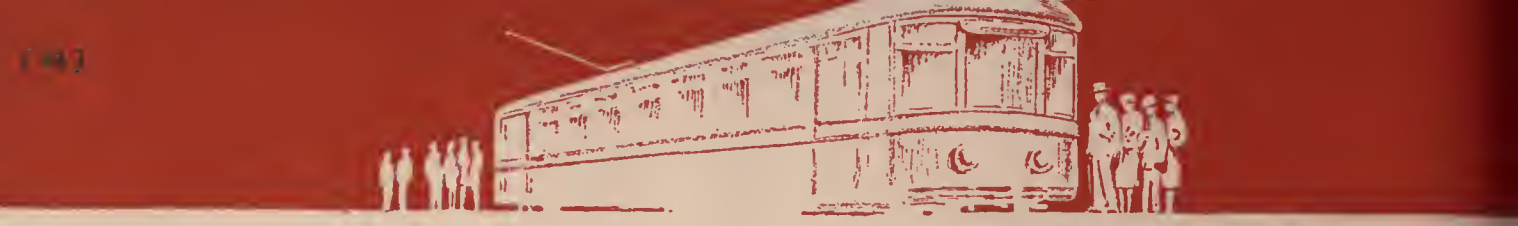
***Executive Office,* 50 Church Street, New York**

***General Works,* Rahway, New Jersey**

CHICAGO
518 McCormick Building

MANUFACTURED IN
TORONTO, CANADA BY
Railway & Power Engineering Corp., Ltd.

PHILADELPHIA
1010 Colonial Trust Building



Grand Rapids Rides *On* and *Under*

KEMI-SUEDE

When the Grand Rapids Railway ordered 27 new cars they specified KEMI-SUEDE for roofing and half seat-covers and also for some curtains.

And Kemi-Suede is holding up wonderfully well under the all-weather strain that roofing gets . . . and the heavy-duty friction inflicted upon seat covers.



Write today for samples.

Kemi-Suede is waterproof, easily cleaned with soap and water. Its "pressed through" construction makes it a "bear for wear."

Kemi-Suede won't check, crack, or peel....is unaffected by heat or cold, comes in several weights and many attractive shades.

Kemi-Suede is always reliable, always brutally strong and long-wearing—always specified when the BEST roofing, seat covers, flooring and curtain material is desired.

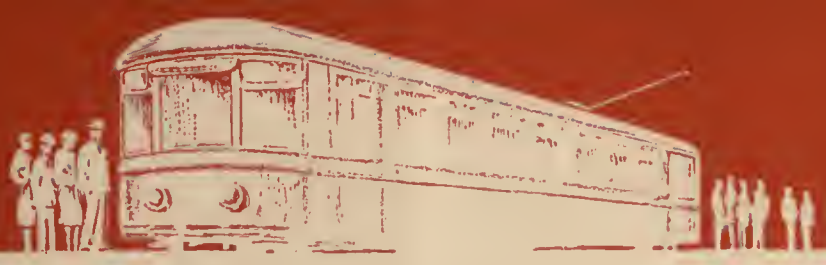
The LEON L. WOLF WATERPROOF FABRIC Co.

519 MAIN ST. CINCINNATI, O.

Dept. D

Cable Address: Lewolf, Cincinnati

Distributors Everywhere.



Grand Rapids joins the rapidly growing list of users of SKF equipped journals



SKF

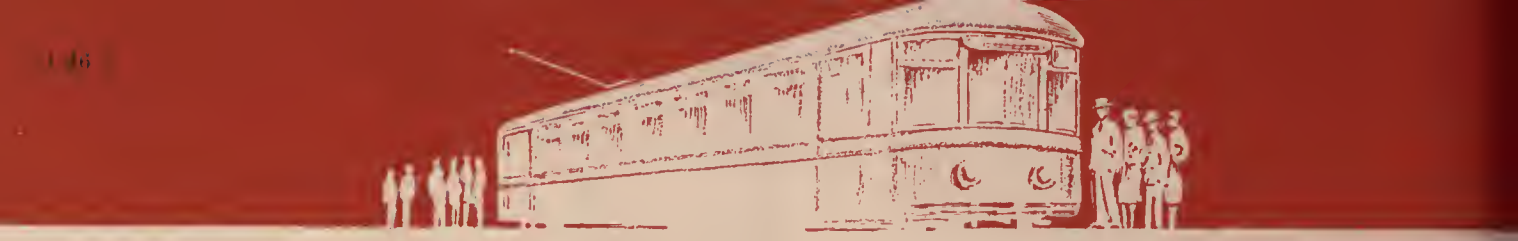
As an indication of the increasing recognition of roller bearings in this field, it is significant that several of the Grand Rapids Railway's newest cars have journals equipped with SKF Spherical Bearings.

To eliminate journal wear, collar wear, hot boxes, and waste of oil and packing, install these rugged, dependable units—SKF Journal Bearings.

Send for our Special Certified Survey to get full particulars.

SKF INDUSTRIES INC., 165 Broadway, New York City





Add another to the list of prominent users of



Rex METAL Sash

and weatherstrip—

Comfort, appearance and safety are written large in the requirements of all the equipment for the Grand Rapids Railway's new cars. It is therefore significant that they specified Rex Equipment.



Being all metal, Rex Sash is fireproof, provides greater light area, and does not swell, warp, crack or need repainting. Windows can be easily raised and lowered at all times. Such factors build up the goodwill of the riding public—which results in increased revenue.

Write for particulars of Rex Equipment and information about other prominent users and what it has accomplished for them.

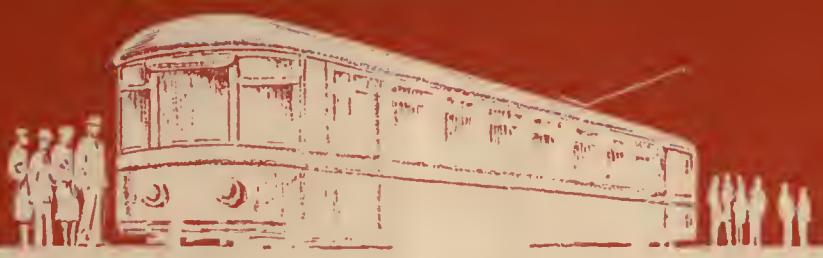
THE CURTAIN SUPPLY COMPANY

ELKHART, IND.

Suite 1132, Marquette Building,
CHICAGO, ILL.

50 Church St.,
NEW YORK, N. Y.

PACIFIC COAST PLANT: 801 Lyon Street, LOS ANGELES, CALIF.



Again HASKELITE and PLYMETL have been chosen by a leading car operator *for light-weight engineering*

Light weight is to be a salient feature of the fine new equipment under construction for the Grand Rapids lines. Of all materials, HASKELITE, the engineering plywood, and PLYMETL, its steel-armored partner, have most consistently demonstrated their superiority in light weight and strength both in the building of new cars and the rehabilitation of old ones. It is natural, therefore, that the specifications for these cars should have read: "HASKELITE roofs and interior linings; PLYMETL for side panels."

The actual saving in weight by the adoption of these materials was as follows:

	Replacing	Sq. Ft.	Saving Lbs.
Interior side lining—$\frac{1}{8}$-in. 3-ply Haskelite	$\frac{5}{16}$-in. cherry	46.2	34
Roofs—$\frac{1}{4}$-in. 3-ply poplar Haskelite	$\frac{3}{8}$-in. poplar T. & G.	238	100
Side panels—$\frac{1}{4}$-in. 4-ply VE Plymetl	No. 12 B. & S. gauge steel	149	435
			569

@ 6c. lb. annual saving per car $34.14

A list of present users, copies of letters from railway men and a blueprint booklet showing detailed application of HASKELITE and PLYMETL, will be sent gladly upon request.

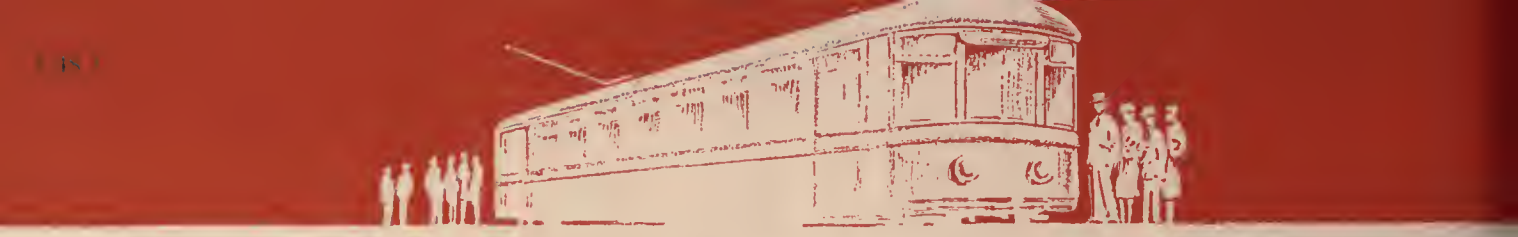
HASKELITE MANUFACTURING CORPORATION
133 W. Washington Street, CHICAGO, ILLINOIS



HASKELITE PLYMETL

For roofs, floors, linings, etc. Light, strong, stiff, easy to apply and to repair. Can be bent to any reasonable radius.

For side panels, etc. Lighter than steel, greater strength, and greater resistance to impact and buckling. Makes a quiet well-insulated car.



EAGLE-OTTAWA
"Good Leather"

Nothing can be closer to the subject of comfort than the seats on which passengers attempt to find relaxation during the street car ride.

Grand Rapids indeed has set a pace in passenger comfort by the use of up-to-date, stylish, double chair type seats—all leather-upholstered with Eagle-Ottawa Colonial Grain Leather.

This product meets the Grand Rapids requirements—attractiveness, ease of cleaning, durability and economy.

Eagle-Ottawa Leather has proved its worth in hundreds of cars and buses. As a seat upholstery material, it is unsurpassed.

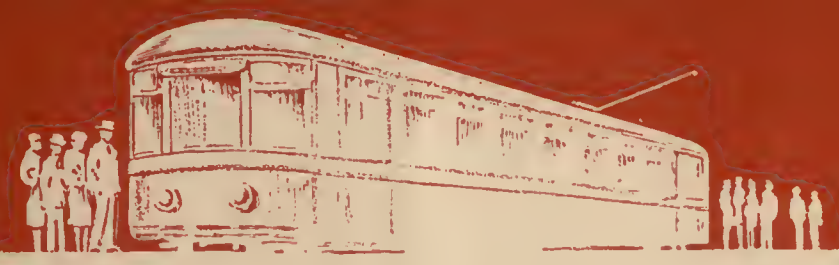
EAGLE-OTTAWA LEATHER COMPANY

Grand Haven, Mich.

BRANCH OFFICES:
509 Howard St., San Francisco, Calif.
912-922 W. Washington Blvd., Chicago, Ill.
74 Gold St., New York, N. Y.



The Worlds Largest Producers of Fine Upholstery Leather!



Grand Rapids Specifies More-Jones No. 25 Trolley Wheels



In keeping with their idea for strict modernity, Grand Rapids made More-Jones No. 25 Trolley Wheels their choice. A certain few facts about design, materials and construction of this No. 25 Trolley Wheel, plus an outstanding service record, gave Grand Rapids every reason for making their decision.

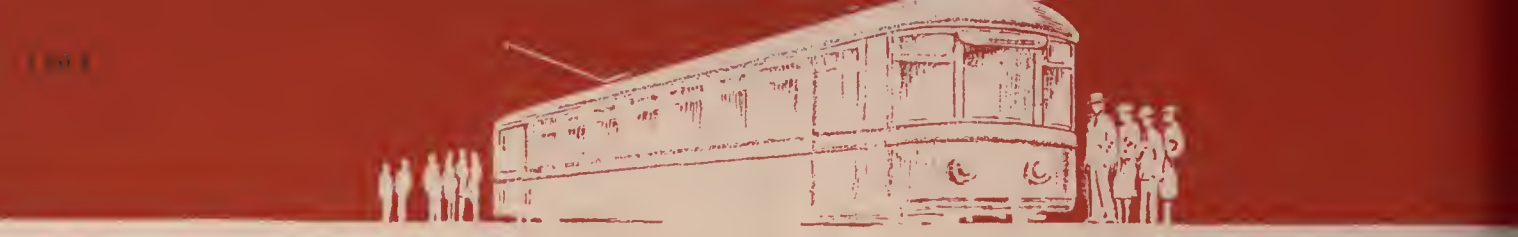
Here are some of the reasons why—The metal used is exceedingly tough, an alloy of purest new metal, insuring maximum conductivity yet does not grind away the metal of the wire. Perfect lubrication is accomplished automatically. Properly balanced and mechanically perfect in finish. Greater mileage assured. Lowest in ultimate cost and highest in net efficiency.

Ask about More-Jones Armature Babbitt Metal scientifically compounded for the railway field exclusively and our Tiger Bronze Axle and Armature Bearings which insure maximum service under hardest operating conditions.

MORE-JONES QUALITY PRODUCTS

MORE-JONES BRASS & METAL CO.

ST. LOUIS, MO.



KASS Safety Treads



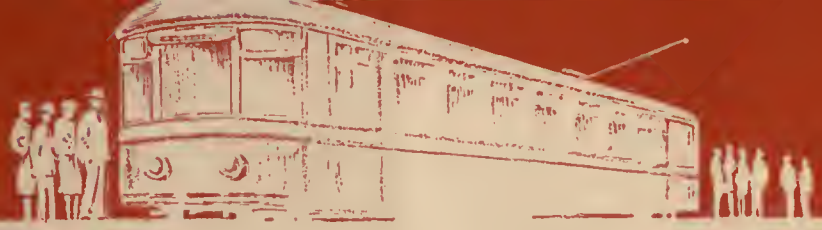
Again specified for MODERN Cars

All over the country modern cars,—safe, ride-promoting, profit-earning cars,—are being equipped with Kass Safety Treads. Now comes Grand Rapids with an order for rolling stock which will set a new pace in car design,—and here again the specifications call for Kass Safety Treads.

The reason is simple and specific. Kass Safety Treads have *proved* lightest in weight, highest in non-skid efficiency, and lowest in initial and upkeep costs.

May we send our supporting data?

MORTON MANUFACTURING CO.
5133 W. Lake St., CHICAGO, ILL.



Provide all year 'round comfort with Utility Car Heating Apparatus

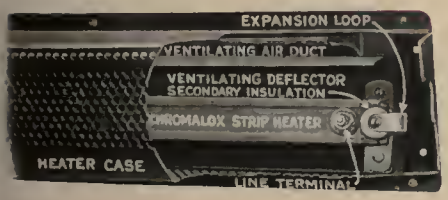
Included in Underwriters' Laboratories List of Inspected Electrical Appliances.

UTILITY CAR HEATING AND HEAT REGULATING EQUIPMENT was installed in the 27 Grand Rapids cars after extensive comparative tests with other competitive devices.



Utility New Type Heat Regulator No. 9 provides greater uniformity of temperature and comfort with 50% saving in current.

To provide proper heat at all times for the comfort of passengers, the Grand Rapids Railway installed Utility Truss Plank and Vestibule Heaters and Type No. 9 Heat Regulators.

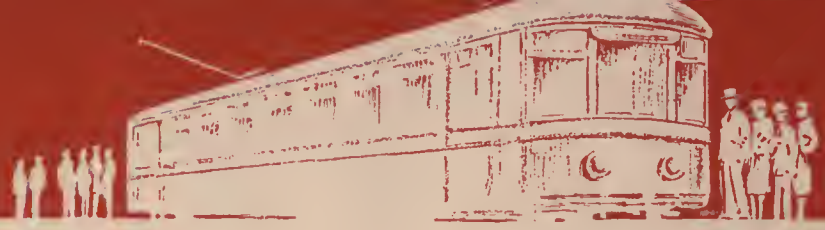


Truss Plank Heater showing "Chromalox" Strip in place, with ventilating air duct and ventilating deflector which keep the back of the heater cool and throw all the heat units out into the car instead of dissipating a lot of energy through the wall or side of the car.

For more complete information about Utility Car Heating, Ventilating, and Heat Regulating Devices get our catalog and quotations.

RAILWAY UTILITY COMPANY

141-151 West 22d St., Chicago, Ill.



Tested—*and accepted!*

Snow Scraper Equipment

ONE year ago we announced the use of Root Spring Scrapers on the Grand Rapids model car then featured in this paper. Today we are pleased to announce Root Spring Scrapers on all 27 new cars ordered by Grand Rapids.

Recognition of our equipment by the Grand Rapids Railway is particularly gratifying in view of the extensive tests and investigations made by that Company before specifying.

ROOT SPRING SCRAPER CO.
Kalamazoo, Mich.



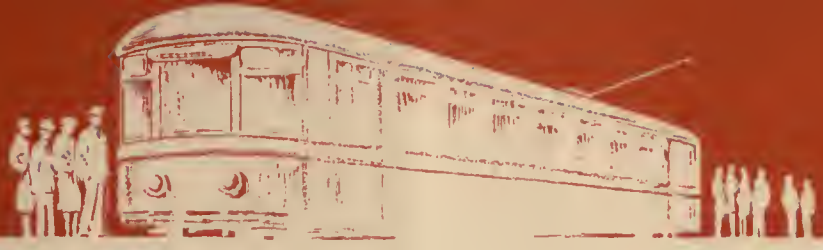
Root Spring Scrapers are operated pneumatically. The motorman applies them instantly from his post at the controller. Root Spring Scrapers efficiently remove snow or slush, whether hard or soft, packed or loose.

Root Spring Scrapers will be found invaluable in maintaining service and schedules under adverse weather conditions.



ROOT

Spring Snow Scraper



Again!



—the most modern cars use the ever-reliable

PEACOCK STAFFLESS

THESE Grand Rapids cars are considered the last word in up-to-date car design and equipment.

That they use the ever-reliable, time-tested Peacock Staffless Brakes is surely significant evidence that proved performance and modern design are well combined in Peacock Staffless Brakes.

Almost unlimited chain-winding capacity, high-braking power, light-weight and space-saving dimensions adapt these brakes to every type of car.

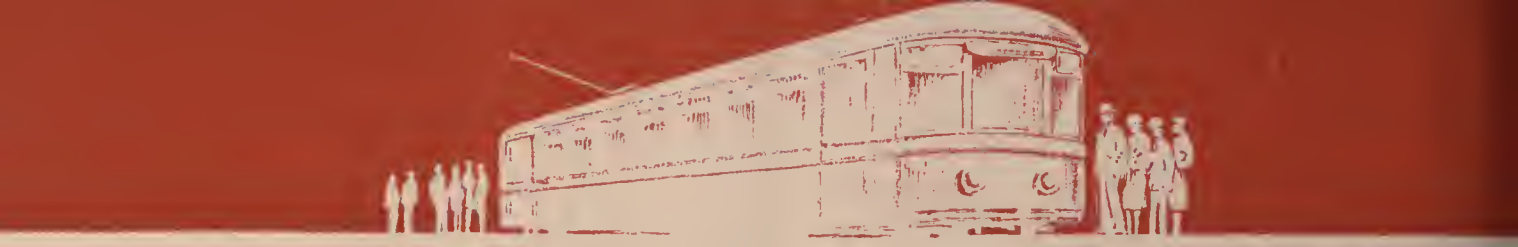
Installation estimates on request.

National Brake Co., Inc.

890 Ellicott Sq., Buffalo, N. Y.

Canadian Representative:

Lyman Tube & Supply Company, Limited, Montreal, Canada



AUTOMOBILE competition has altered conditions. Consequently a changed viewpoint with regard to car design is rapidly taking place. Since "ride merchandising" is a comparatively new term in the electric railway vocabulary it is not surprising that this element in car design has only recently begun to command general attention. There seems to be no fundamental reason why the street car cannot be made as attractive to the eye as can an automotive vehicle operating on the highway and carrying its own power plant.

The editorial below from the Sept. 26, 1925, issue of Electric Railway Journal seems particularly significant in the light of the progress made by Grand Rapids.

The Car Reflects the Standing of the Railway In Its Community

MUCH of the popular idea that the street railways are destined for the scrap heap is attributable to the appearance of some of the cars now in service. Such cars create the impression of an obsolete industry. The public does not see conditions in the shops or substations, but the cars are constantly on parade. While this is not a universal condition by any means, it is true of many cities. A long series of circumstances, many beyond the control of the railway, has sometimes interfered with the purchase of new cars. Too frequently, however, the railway management itself has been responsible for the operation of obsolete rolling stock. It has tried to get the very last possible day's work out of each car before scrapping it.

Preservation of the standing of the railway in its community makes it imperative that old cars be replaced by those of modern design, entirely aside from considerations of efficiency and operating cost. Money spent for remodeling cars that have been in service for fifteen or twenty years is often worse than wasted because it merely postpones the day when up-to-date equipment can be purchased. Modern cars are needed to meet modern conditions. The car designer holds the key to public approval and increased patronage. Attention to the details of lines and appearance will produce a general improvement in car architecture. Application of the same principles that lead a merchant to give careful thought to the appearance of his store front will inevitably attract more riders and make more friends for the electric railways.

It is obvious that the most expensive car to operate is the one that attracts no patronage.



One hundred and twenty five of these cars furnished the Department of Street Railways, City of Detroit.

Build New Business *with New Cars*

It is an established fact in many cities that new and modern cars create new business. New cars can do the same on your property. Increased revenue coupled with decreased maintenance and operating expense are two factors in the replacing of obsolete cars with modern Cummings Cars.

Our engineers are thoroughly conversant with modern features of car design and construction. Let them cooperate with you in the planning and building of new equipment, or allow them to quote on your requirements.

CUMMINGS CAR AND COACH COMPANY

Successor to McGuire Cummings Mfg. Co.

111 W. Monroe Street
CHICAGO, ILL.



MC62 Low Car Body Truck

LIGHT WEIGHT CITY AND INTERURBAN CARS

LIGHT WEIGHT SINGLE AND DOUBLE TRUCKS

GAS-ELECTRIC MOTOR COACHES

BRILL

Make the railway a source of civic pride



Read through the average chamber of commerce booklet. Even office buildings come in for proud mention. And if the average citizen can feel a glow of civic pride for office buildings, why not for his electric railway system, a service which fundamentally concerns the growth and prosperity of his community?

can be done with handsome cars

The street car has pride of place on the thoroughfares of the community it serves. More often than not it is a dominant feature of the city scene.

Why then should it not be the most handsome feature too—a source of pride to the citizens and the company, a constant breeder of goodwill and an incentive to greater use of railway facilities?

It can be, and it is in many progressive cities today. For these electric railway companies have stopped losing time, money and goodwill on obsolete equipment. They have replaced rolling stock of a past generation with speedy and impressively handsome modern cars, smooth and silent in operation, streamlined, and furnished for passenger comfort.

And what has been the result? Systems which previously came in for little else but criticism from their patrons are now popular—a source of civic pride. Earnings have jumped, and the new, efficient equipment has naturally proved economical in operation.

Furthermore, employees have caught something of the spirit, a sound foundation of good modern service has been laid, which can more easily withstand the onslaughts of competition.

THE J. G. BRILL COMPANY
PHILADELPHIA, PA.
AMERICAN CAR CO. ST. LOUIS, MO. — G. C. KUHLMAN CAR CO. CLEVELAND, OHIO. — WASON MANF'G CO. SPRINGFIELD, MASS.



Each of Your Salesmen Should Have the 1926 Edition Electric Railway Directory

Because:—

All purchases are passed upon by two and often three officials before the order is placed. If your salesmen are not procuring orders they are not interviewing the proper officials.

With 65% changes in this directory over 1925, it is very important your salesmen are directed right to save time and possibly embarrassment.

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I

Directory Department, Electric Railway Journal, 10th Avenue and 36th St., New York, N. Y.

Gentlemen:—Will you please send me:

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Name .....

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E.R.J. 5-29-26

Southern cities sell transportation on a modern basis

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To read even this *partial* list of users of new Thomas Cars is to realize that southern cities are turning to the modern electric railway car as the means of carrying more revenue passengers at a lower cost per passenger. This is the recognized basis of building net revenue and thus paying reasonable dividends to stockholders.

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1926

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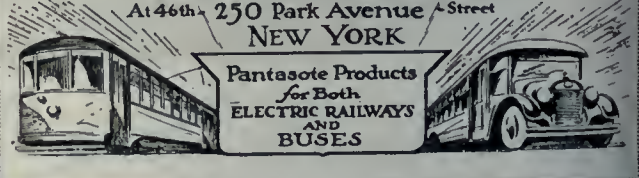
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This fleet of 12 Studebaker Busses, all of the 20-Passenger Parlor Car De Luxe-type, was recently purchased by The Columbus-Springfield Bus Company—as the result of previous experience with Studebakers.

Studebaker Bus Operators Buy More Studebakers

When they need additional equipment

—because experience proves the higher economy of Studebaker Busses

THE Columbus-Springfield Bus Company, operating between Columbus, London and Springfield, Ohio, purchased the twelve Studebaker Parlor Cars shown above—because of previous experience with Studebaker Busses.

The partners in this company were previously independent operators running Studebaker passenger cars and busses on Studebaker passenger-car chassis. When the company was formed, they discarded their old equipment and ambitiously purchased a fleet of large-capacity units—each more than double the price of the Studebaker and almost twice as heavy. Result: the company suffered a loss, every month getting deeper and deeper in the red.

Recently the company was reorganized. And at once the heavy, large-capacity units were replaced by medium-capacity Studebaker Parlor Cars. Experience with both types of equipment was the reason.

As the list below shows, there are scores of operators who have similarly made repeat purchases of Studebaker equipment, having proved by experience that Studebaker Busses are more economical to operate and earn higher profits. Many use Studebakers exclusively.

Due to standardization of design and large-scale production, the first cost of the medium-capacity Studebaker Bus, complete with body, is about one-half the cost of the large-capacity bus. Operating expense is less because it is 50% lower in weight than the average heavy truck-type bus. As proved by hundreds of Studebaker Busses with records of over 100,000 miles, it gives scores of thousands of miles of thoroughly dependable service, thereby greatly reducing depreciation.

Obviously, the Studebaker operator enjoys a preferred position. For, with the price of a Studebaker Bus practically half that of a big bus—and with the low operating cost per bus mile—he is able to double the frequency of the schedule with the same total investment and the same total cost of operation.

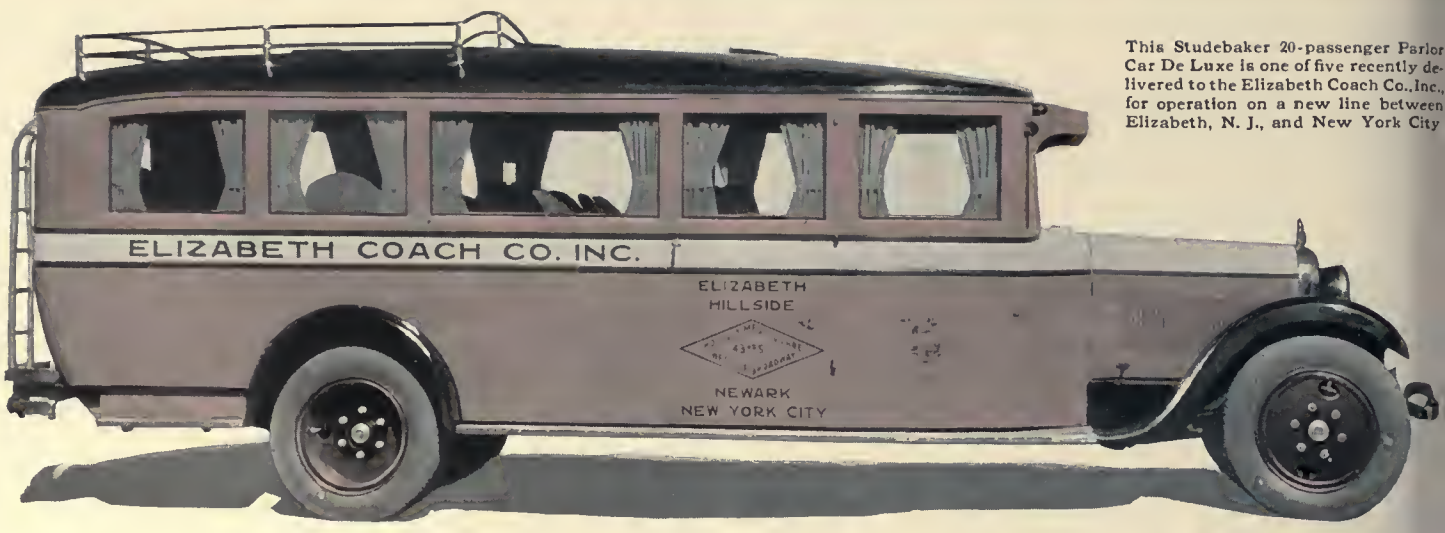
More than 1000 operators are using Studebaker Busses—convinced by actual cost records that they insure "more profit per passenger mile."

—first cost
—depreciation cost
—maintenance cost
—operating cost
Lower

Partial List of Operators Who Have Made Repeat Purchases of Studebaker Busses

H. & H. Bus Line, Tuscumbia, Ala.
Bisbee-Tucson Stage, Tucson, Ariz.
Star Auto Stage, Tucson, Ariz.
Interstate Trans. Co., San Francisco, Cal.
Hallbrook & Shuler, Bell, Cal.
Arrowhead Line, Los Angeles, Cal.
Mercantile Trust Co., San Francisco, Cal.
Scioto Valley Bus Co., Chillicothe, Ohio
Yelloway, Inc., Denver, Colo.
Danbury-Waterbury Bus Lines, Danbury, Conn.
Bridgeport & Waterbury Pass. Service, Waterbury, Conn.
Motor Travel Bureau, Inc., Denver, Colo.
Cannonball Trans. Co., Portsmouth, Ohio
West Flagler Terminal Lines, Miami, Fla.
Mt. Plymouth Corp., Orlando, Fla.
Interstate Realty Co., Tampa, Fla.
Vanacker & Knapp, Miami, Fla.
Red Star Trans. Co., Cambridge, O.
Wabash Valley Trans. Co., Marshall, Ill.
I. U. Bus Lines, W. O. Springer & Son, Greenwood, Ind.
Interstate Mtr. Trans. Co., Chillicothe, Ohio
Jahns Bus Co., Laporte, Ind.
King Bros., Richmond, Ind.
Southern Kansas Stage Lines, Wichita, Kans.
Blue Coach Line, Erlanger, Ky.
Dixie Traction Co., Erlanger, Ky.
Barnes Bros., Lexington, Ky.
Red Star Trans. Co., Lexington, Ky.
Thorobred Transit Co., Lexington, Ky.
Steubenville-Canton Trans. Co., Steubenville, Ohio
Motor Transit Co., Shreveport, La.
Tri-State Transit Co., Shreveport, La.
White Line Bus Co., Lewiston, Me.
Blue Line Bus Co., Lewiston, Me.
Old Trails Bus Line, Frostburg, Md.
Flint-Ann Arbor Motor Coach Line, Ann Arbor, Mich.
Columbus & Zanesville Transp. Co., Zanesville, Ohio
Ohio Transit Co., Columbus, Ohio
Interstate Transit Co., Portsmouth, Ohio
C. & Z. Traction Co., Columbus, O.
Dexter Transfer Co., Dexter, Mo.
Mr. Tom H. Scofield, Charleston, Mo.
Midwest Transit Co., St. Louis, Mo.
Mr. H. A. Chase, Missoula, Mont.
Gardnerville Stage Co., Gardnerville, Nev.
Dewey Transit Co., Reno, Nev.
Mr. H. McCloskey, Beverly, N. J.
I. C. & E. Traction, Springfield, O.
Elizabeth Coach Co., Inc., Elizabeth, N. J.
Sunset Trail Bus Co., Inc., Jersey City, N. J.
New Jersey Motor Coach Co., Westwood, N. J.
H. & K. Truck Lines, Las Cruces, N. Mex.
E. A. White, Inc., New York City, N. Y.
Gray Line Bus System, Inc., Mt. Kisco, N. Y.
Palace Coach Lines, Inc., New York City, N. Y.
Hudson Valley Coach Co., Newburgh, N. Y.
The Ward-Way, Inc., Muskogee, Okla.
Penn Yan-Geneva Bus Line, Penn Yan, N. Y.
Bost Transfer Co., Newton, N. C.
Cress & Lowder, Concord, N. C.
Washington Transp. Co., Washington, Pa.
White Star Bus Co., Albemarle, N. C.
Denny & Walters, Charlotte, N. C.
Eastern Carolina Coach Co., Charlotte, N. C.
B. & H. Coach Line, Inc., Newton, N. C.
Blueridge Trail, Asheville, N. C.
Inter Carolinas Motor Bus Co., Asheville, N. C.

STUDEBAKER BUS CHASSIS



This Studebaker 20-passenger Parlor Car De Luxe is one of five recently delivered to the Elizabeth Coach Co., Inc., for operation on a new line between Elizabeth, N. J., and New York City

Unexcelled Luxury and Design at Unequaled Low Price

— New Studebaker 20-Passenger Parlor Car matches the highest-priced busses in design, comfort and dependability — mounted on the most powerful bus chassis of its size in the world

BUS operators have enthusiastically received the new Studebaker Parlor Car De Luxe. *First*, because of its beautiful design and luxurious comfort. *Second*, because it combines remarkably low first cost—$6125—with low operating cost.

Ultra-smart appearance

In appearance and luxury of riding comfort, it can be compared only with the large parlor car busses selling at from $10,000 to $12,000.

Note the low-hung body with its graceful tapering roof. Length over all, 283¾ inches. Framework is of selected hardwood. Finish is rich, durable lacquer.

Entrance door (32 inches wide) is on the forward right-hand side. Controlled by hidden mechanism, which is operated by a small hand lever at the left of the driver's seat. Separate door for driver. Emergency door at left rear.

Luxurious, roomy interior

Every interior feature is painstakingly planned to give utmost physical and mental relaxation to passengers. Individual armchairs, upholstered in genuine leather, with cane sides. Liberal leg room (30 inches) and head room (61 inches). Broad center aisle. Accommodation for 20 passengers, including driver.

Comfort is enhanced by such details as wide, easily adjustable windows with boquet draperies; mohair head lining and side lining; dome lights; window-post mirrors; an exhaust heating system. Six ventilators are provided—one in the cowl, two over the windshield, and three in the roof—insuring continuous circulation of air without draught. There is a railed-in baggage compartment at the driver's right, and additional accommodation for luggage on the roof.

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Mounted on specially designed Studebaker bus chassis, this bus is ideal for intercity and suburban service. It has the speed, stamina and dependability to answer the severest demands of service.

According to the rating of the Society of Automotive Engineers, it is the most powerful bus chassis of its size in the world. There are 36 bus chassis on the market with *less* rated power and *more* weight.

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Unusually complete equipment

Equipment is complete, including stop signal system; illuminated destination sign box (above windshield); automatic windshield cleaner; rear-view mirror; front and rear bumpers; motometer; extra wheel with tire, tube and carrier, mounted on left front fender; 8-day clock and gasoline gauge, plus the usual instruments, mounted in an oval group under glass; inspection lamp with 10-foot cord. Lights are controlled by a steering-wheel switch.

Due to standardized design and large-scale production, the new Studebaker Parlor Car De Luxe is offered at a remarkably low price. Operators find that its smart appearance and luxurious riding comfort attract continuous patronage, while its very low initial and operating costs insure *much higher profit per passenger mile.*

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21-Pass. Pay-As-You-Enter Street-Car Type*	$5125

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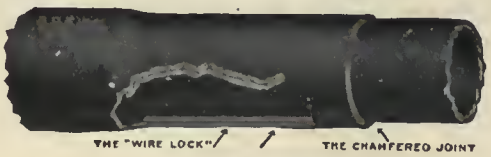
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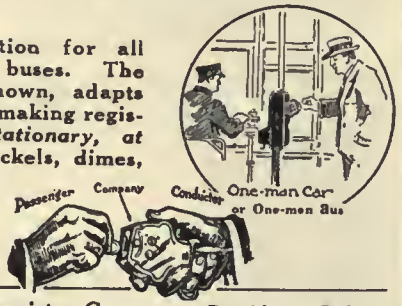
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The value of Kalamazoo Trolley Wheels and Harps has been demonstrated by large and small electric railway systems for a period of thirty years. Being exclusive manufacturers, with no other lines to maintain, it is through the high quality of our product that we merit the large patronage we now enjoy. With the assurance that you pay no premium for quality we will appreciate your inquiries.



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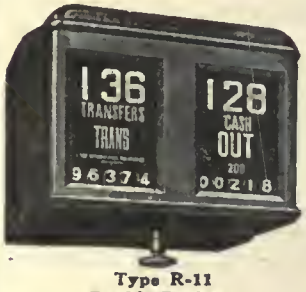
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FOR INFORMATION REGARDING THE ABOVE, WRITE OR WIRE

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50 CHURCH ST. NEW YORK CITY

POSITIONS WANTED

AUDITOR with eleven years' continuous public utility experience railway, bus, gas and electric departments, desires position where promotion depends on ability. Now employed; can obtain release with reasonable notice. PW-904, Electric Railway Journal, Star Building, St. Louis, Mo.

CO-ORDINATION may mean an addition to your staff as well as to your equipment. Young man, engineering training having six years' experience in both operation and maintenance of buses, desires change. Qualified to take complete charge of bus department or subsidiary. Experienced in traffic, public relations, personnel, and costs. Midwestern location preferred. P.W.-908, Electric Railway Journal, Tenth Ave. at 36th St., New York.

RAILWAY superintendent in charge of operation and maintenance of rolling stock track and overhead, an outstanding success in operating co-ordinated railway and coach service, desires change for personal reasons. Correspondence invited. PW-887, Electric Railway Journal, 7 So. Dearborn St., Chicago, Ill.

TEN years' experience as railway winder. Steam and electric railway experience. Can give A-1 statement in regard to my work. Will go anywhere. PW-911, Electric Railway Journal, 7 So. Dearborn St., Chicago, Ill.

SALESMEN WANTED

Car Salesman

Qualified in sales engineering and well acquainted with electric railway industry. Give age, experience in detail, and salary. SW-912, Electric Railway Journal, Tenth Ave. at 36th St., New York.

OFFICIAL PROPOSALS

Bids: June 16.

Special Trackwork Channels and Appurtenances—Broad Street Subway

CONTRACT NO. 124
DEPARTMENT OF CITY TRANSIT
11th FLOOR, 1211 CHESTNUT ST.

Philadelphia, May 18, 1926.

Sealed proposals, addressed to the undersigned, at the office above mentioned, will be received until 11 o'clock (Eastern Standard Time), on Wednesday, June 16, 1926, and publicly opened immediately thereafter, for furnishing special trackwork, channels and appurtenances for the Broad Street Subway.

Plans and specifications may be seen at the office of the Department, on the 12th floor, 1211 Chestnut Street, and copies of same, with blank forms for proposals, will be supplied to intending bidders upon application. A deposit of Fifty (50) Dollars will be required for the plans and specifications. This deposit will be refunded upon return of the plans and specifications in good condition.

Bidders must be skilled and regularly engaged in the class of work for which they are competing.

No bid will be considered unless accompanied by a certified check on a responsible bank or trust company in favor of the City of Philadelphia, to the amount of five (5) per centum of the sum of such bid, in accordance with the provisions of an ordinance approved March 7, 1924, as amended by ordinance approved July 2, 1924, and reprinted in full in the specifications.

The Director reserves the right to reject any or all bids, as he may deem best for the interest of the City of Philadelphia.

H. E. EHLERS,
Director.

OFFICIAL PROPOSALS

Bids: June 23.

Special Trackwork and Appurtenances—Terminal Yard —Broad Street Subway

CONTRACT NO. 125
DEPARTMENT OF CITY TRANSIT
11TH FLOOR, 1211 CHESTNUT ST.

Philadelphia, May 25, 1926.

Sealed proposals, addressed to the undersigned, at the office above mentioned, will be received until 11 o'clock (Eastern Standard Time), on Wednesday, June 23, 1926, and publicly opened immediately thereafter, for furnishing special trackwork, and all appurtenances for the Fern Rock Terminal Yard of the Broad Street Subway.

Plans and specifications may be seen at the office of the Department, on the twelfth floor, 1211 Chestnut Street, and copies of same, with blank forms for proposals, will be supplied to intending bidders upon application. A deposit of Fifty (50) Dollars will be required for the plans and specifications. This deposit will be refunded upon return of the plans and specifications in good condition.

Bidders must be skilled and regularly engaged in the class of work for which they are competing.

No bid will be considered unless accompanied by a certified check on a responsible bank or trust company in favor of the City of Philadelphia to the amount of five (5) per centum of the sum of such bid, in accordance with the provisions of an ordinance approved March 7, 1924, as amended by ordinance approved July 2, 1924, and reprinted in full in the specifications.

The Director reserves the right to reject any or all bids, as he may deem best for the interest of the City of Philadelphia.

H. E. EHLERS,
Director.

"SEARCHLIGHT" RATES

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UNDISPLAYED:

Positions Wanted—4 cents a word, minimum charge—75 cents an insertion.
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Discount of 10% for payment in advance on 4 consecutive insertions of undisplayed advertisements.
Proposals—40 cents a line.

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Space is sold by the "inch," with 30 inches to a page. (An "inch" measures approximately 1 inch high by 2¼ inches wide.) Rates are from $4.50 to $3.00 an inch, depending on the total space used.

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30 Birney Safety Cars

Brill Built

West. 508 or G. E. 264 Motors. Cars Complete—Low Price—Fine Condition.

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Commonwealth Bldg., Philadelphia, Pa.

SEARCHLIGHT SERVICE SECURES SATISFACTORY SITUATIONS

G-23

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1—500 kw., 600-v., 833 amp., 900 r.p.m., 6-ph., compound wound Westinghouse Rotary Converter, with 3—165 kva., 60-cy., single ph., 13200 v. primary transformers with A.C. and D.C. panels.

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WHAT AND WHERE TO BUY

Equipment, Apparatus and Supplies Used by the Electric Railway Industry with Names of Manufacturers and Distributors Advertising in this Issue

Advertising, Street Car
Collier, Inc., Barron G.

Air Brakes
Westinghouse Air Brake Co.

Air Receivers & Aftercoolers
Ingersoll-Rand Co.

Anchors, Guy
Elec. Service Supplies Co.
Ohio Brass Co.
Westinghouse E. & M. Co.

Armature Shop Tools
Elec. Service Supplies Co.

Asphalt Paint
American Asphalt Paint Co.

Automatic Return Switch Stands
Ramapo Ajax Corp.

Automatic Safety Switch Stands
Ramapo Ajax Corp.

Axles
Bethlehem Steel Co.
Brill Co., The J. G.
Carnegie Steel Co.
Johnson & Co., J. R.
National Ry. Appliance Co.
St. Louis Car Co.
Westinghouse E. & M. Co.

Axles, Carbon Vanadium
Johnson & Co., J. R.

Axles, Steel
Bethlehem Steel Co.
Carnegie Steel Co
Johnson & Co., J. R.
Ludlum Steel Co.

Babbit Metal
Johnson & Co., J. R.
More-Jones Brass & Metal Co.

Badges and Buttons
Elec. Service Supplies Co.
International Register Co.

Barges, Steel
American Bridge Co.

Batteries, Dry
Nichols Lintern Co.

Bearings and Bearing Metals
Brill Co., The J. G.
General Electric Co.
More-Jones Brass & Metal Co.
St. Louis Car Co.
Westinghouse E. & M. Co.

Bearings, Center and Roller Side
Stucki Co., A

Bearings, Roller
Timken Roller Bearing Co.

Bearings, Roller & Ball
S. K. F. Industries

Bells & Buzzers
Consolidated Car Heating Co.

Bells and Gongs
Brill Co., The J. G.
Elec. Service Supplies Co.
St. Louis Car Co.

Benders, Rail
Railway Trackwork Co.

Bodies, Bus
Cummings Car & Coach Co.
Graham Bros.

Body Material, Haskelite and Plymetl
Haskelite Mfg. Corp.

Bollers
Babcock & Wilcox Co.

Bond Testers
American Steel & Wire Co.
Electric Service Supplies Co.

Bonding Apparatus
American Steel & Wire Co.
Electric Railway Improvement Co.
Elec. Service Supplies Co.
Ohio Brass Co.
Railway Trackwork Co.
Una Welding & Bonding Co.

Bonds, Rail
Amer. Steel & Wire Co.
Electric Railway Improvement Co.
Elec. Service Supplies Co.
General Electric Co.
Ohio Brass Co.
Railway Trackwork Co.
Una Welding & Bonding Co.
Westinghouse E. & M. Co.

Book Publishers
McGraw-Hill Book Co.

Brackets and Cross Arms (See also Poles, Ties, Posts, Etc.)
American Bridge Co.
Elec. Ry. Equipment Co.
Elec. Service Supplies Co.
Hubbard & Co.
Ohio Brass Co

Brake Adjusters
Brill Co., The J. G.
National Ry. Appliance Co.
Westinghouse Tr. Br. Co.

Brake Shoes
Brill Co., The J. G.
St. Louis Car Co.

Brakes, Brake Systems and Brake Parts
Brill Co., The J. G.
General Electric Co.
National Brake Co.
Safety Car Devices Co.
St. Louis Car Co.
Westinghouse Tr. Br. Co.

Bridges, Steel
American Bridge Co.

Brushes, Carbon
General Electric Co.
Jeandron, W. J.
Le Carbone Co.
Morganite Brush Co.
Westinghouse E. & M. Co.

Brushes Graphite
Morganite Brush Co.

Brushes, Wire, Pneumatic
Ingersoll-Rand Co.

Bulldogs, Steel
American Bridge Co.

Bulkheads
Haskelite Mfg. Corp.

Bunkers, Coal
American Bridge Co.

Bus Seats
Hale-Kilburn Co.

Buses, Motor
Brill Co., The J. G.
Cummings Car & Coach Co.
International Motor Co.
Mack Trucks, Inc.
St. Louis Car Co.
Studebaker Corp. of Amer.
White Co.

Bushings, Case Hardened and Manganese
Brill Co., The J. G.
St. Louis Car Co.

Cables. (See Wires and Cables)

Cambric Tapes, Yellow and Black Varnish
Irvington Varnish & Ins. Co.

Carbon Brushes (See Brushes, Carbon)

Car Lighting Fixtures
Elec. Service Supplies Co.

Car Panel Safety Switches
Consolidated Car Heat. Co.
Westinghouse E. & M. Co.

Car Wheels, Rolled Steel
Bethlehem Steel Co.

Cars, Dump
Brill Co., The, J. G.
Differential Steel Car Co.
St. Louis Car Co.

Cars, Gas, Rail
Brill Co., The, J. G.
St. Louis Car Co.

Cars, Passenger, Freight, Express, etc.
American Car Co.
Brill Co., The J. G.
Cummings Car & Coach Co.
Kuhlman Car Co., G. C.
National Ry. Appliance Co.
St. Louis Car Co.
Thomas Car Works, Perley A.
Wason Mfg. Co.

Cars, Second Hand
Electric Equipment Co.

Cars, Self-Propelled
Brill Co., The, J. G.
General Electric Co.

Castings, Brass Composition or Copper
More-Jones Brass & Metal Co.

Castings, Gray Iron and Steel
American Bridge Co.
American Steel Foundries
St. Louis Car Co.
Wm. Wharton, Jr. & Co.

Castings, Malleable and Brass
St. Louis Car Co.

Catchers and Retrievers, Trolley
Elec. Service Supplies Co.
Ohio Brass Co
Wood Co., Chas. N.

Catenary Construction
Archbold-Brady Co.

Ceiling Car
Haskelite Mfg. Corp.
Pantasote Co., Inc.

Ceilings, Plywood, Panels
Haskelite Mfg. Corp.

Change Carriers
Cleveland Fare Box Co.
Electric Service Supplies Co

Circuit-Breakers
General Electric Co.
Westinghouse E. & M. Co.

Clamps and Connectors for Wires and Cables
Elec. Ry. Equipment Co.
Elec. Ry Improvement Co.
Elec. Service Supplies Co.
General Electric Co.
Hubbard & Co.
Ohio Brass Co.
Westinghouse E. & M. Co

Cleaners and Scrapers Track (See also Snow-Plows, Sweepers and Brooms)
Brill Co., The J. G.
Ohio Brass Co
Root Spring Scraper Co.
St. Louis Car Co.

Clusters and Sockets
General Electric Co.

Coil Banding and Winding Machines
Elec. Service Supplies Co.
Westinghouse E. & M. Co.

Coils, Armature and Field
Economy Electric Devices
General Electric Co.
Westinghouse E. & M Co.

Coils, Choke and Kicking
Elec. Service Supplies Co.
General Electric Co.
Westinghouse E. & M. Co.

Coin Counting Machines
Cleveland Fare Box Co
International Register Co.

Coin Sorting Machines
Cleveland Fare Box Co.

Coin Wrappers
Cleveland Fare Box Co.

Commutator Slotters
Elec. Service Supplies Co.
General Electric Co.
Westinghouse E. & M. Co.
Wood Co., Chas. N.

Commutator Truing Devices
General Electric Co.

Commutators or Parts
Cameron Electrical Mfg. Co.
General Electric Co.
Westinghouse E. & M. Co.

Compressors, Air
General Electric Co.
Ingersoll-Rand Co.
Westinghouse Tr. Br. Co.

Compressors, Air Portable
Ingersoll-Rand Co.

Condensers
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Ingersoll-Rand Co.
Westinghouse E. & M. Co.

Condensor Papers
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Connectors, Solderless
Westinghouse E. & M. Co.

Connectors, Trailer Car
Consolidated Car Heat. Co.
Elec. Service Supplies Co.
Ohio Brass Co

Controllers
Amer. Brown Boveri Elec. Corp.
General Electric Co.
Westinghouse E. & M. Co.

Controllers or Parts
General Electric Co.
Westinghouse E. & M. Co.

Controller Regulators
Elec. Service Supplies Co.

Controlling Systems
General Electric Co.
Westinghouse E. & M. Co.

Converters, Rotary
Amer. Brown Boveri Elec. Corp.
General Electric Co.
Westinghouse E. & M. Co.

Conveying & Hoisting Machinery
American Bridge Co.

Copper Wire
American Brass Co.
Anaconda Copper Mining Co.

Copper Wire Instruments, Measuring, Testing and Recording
American Brass Co.
American Steel & Wire Co
Anaconda Copper Mining Co.

Cord, Bell, Trolley, Register
Brill Co., The J. G
Elec. Service Supplies Co.
International Register Co.
Roebling's Sons Co., John A.
St. Louis Car Co.
Samson Cordage Works

Cord Connectors and Couplers
Elec. Service Supplies Co.
Samson Cordage Works
Wood Co., Chas. N.

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Brill Co., The J. G.
Ohio Brass Co
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Cranes, Hoists & Lifts
Electric Service Supplies Co.

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Wm. Wharton, Jr. & Co

Crossings, Frogs & Switches
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Wm. Wharton Jr & Co.

Crossings, Manganese
Bethlehem Steel Co
Ramapo Ajax Corp.
Wm. Wharton, Jr & Co.

Crossings, Track (See Track Special Work)

Crossings, Trolley
Ohio Brass Co
Westinghouse E. & M. Co.

Curtains & Curtain Fixtures
Brill Co., The J. G.
Curtain Supply Co.
Morton Mfg. Co.
Pantasote Co., Inc.
St. Louis Car Co.

Dealer's Machinery & Second Hand Equipment
Elec. Equipment Co
Sachsenmaier Co., George
Salzberg Co., Inc., H. E.

Dealer Second Hand Rails
Electric Equipment Co.

Derailing Devices (See also Track Work)

Derailing Switches
Ramapo Ajax Corp.

Destination Signs
Elec. Service Supplies Co.

Detective Service
Wish-Service, P. Edward

Door Operating Devices
Brill Co., The J. G
Consolidated Car Heating Co.
Nat'l Pneumatic Co., Inc.
Safety Car Devices Co.

Doors & Door Fixtures
Brill Co., The J. G.
General Electric Co.
Hale-Kilburn Co.
Morton Mfg. Co
St. Louis Car Co.

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Nat'l Pneumatic Co., Inc.
Safety Car Devices Co.

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Electric Service Supplies Co.
Ingersoll-Rand Co.
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Railway Trackwork Co.

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Electrodes, Steel
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Beeler, John A.
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Hemphill & Wells
Holst, Engelhardt W.
Jackson, Walter
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McClellan & Junkersfeld
Richey, Albert S.
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White Eng. Corp., The J. G.

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Electric Service Supplies Co

Fences, Woven Wire and Fence Posts
Amer. Steel & Wire Co

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Consolidated Car Fender Co.
Root Spring Scraper Co.
St. Louis Car Co.
Star Brass Works
Wood Co., Chas. N.

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Flaxlinum Insulators
National Railway Appliance Co.

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Electric Service Supplies Co.

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Haskelite Mfg. Corp

Floors
Haskelite Mfg. Corp.

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Carnegie Steel Co.

Frogs & Crossings, Tee Rail
Bethlehem Steel Co.
Ramapo Ajax Corp
Wm. Wharton, Jr. & Co.

Frogs, Track (See Track Work)

Frogs, Trolley
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Westinghouse E. & M. Co.

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Furnaces, Electric, Steel Melting
American Bridge Co.

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General Electric Co.
Westinghouse E. & M. Co.

Fuses, Refillable
General Electric Co

Gaskets
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St. Louis Car Co.

Gauges, Oil and Water
Ohio Brass Co.

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Carnegie Steel Co.

Gear Cases
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Generators
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Greases (See Lubricants)

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Railway Trackwork Co.

Grinders, Portable
Railway Trackwork Co.

Grinders, Portable Electric
Railway Trackwork Co.

Grinding Bricks and Wheels
Railway Trackwork Co.

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Guard Rails, Tee Rail & Manganese
Ramapo Ajax Corp.
Wm. Wharton, Jr & Co

Guards, Trolley
Elec. Service Supplies Co
Ohio Brass Co

Hammers, Pneumatic
Ingersoll-Rand Co.

Harps, Trolley
Elec. Service Supplies Co
More-Jones Brass & Metal Co.
Nuttall Co., R. D
Star Brass Works

Headlights
Elec. Service Supplies Co
General Electric Co
Ohio Brass Co
St. Louis Car Co.

Headlining
Haskelite Mfg. Corp.
Pantasote Co., Inc.

Heaters, Car (Electric)
Consolidated Car Heating Co
Economy Electric Devices Co.
Gold Car Heat. & Ltg. Co.
Nat'l Ry. Appliance Co.
Smith Heater Co., Peter

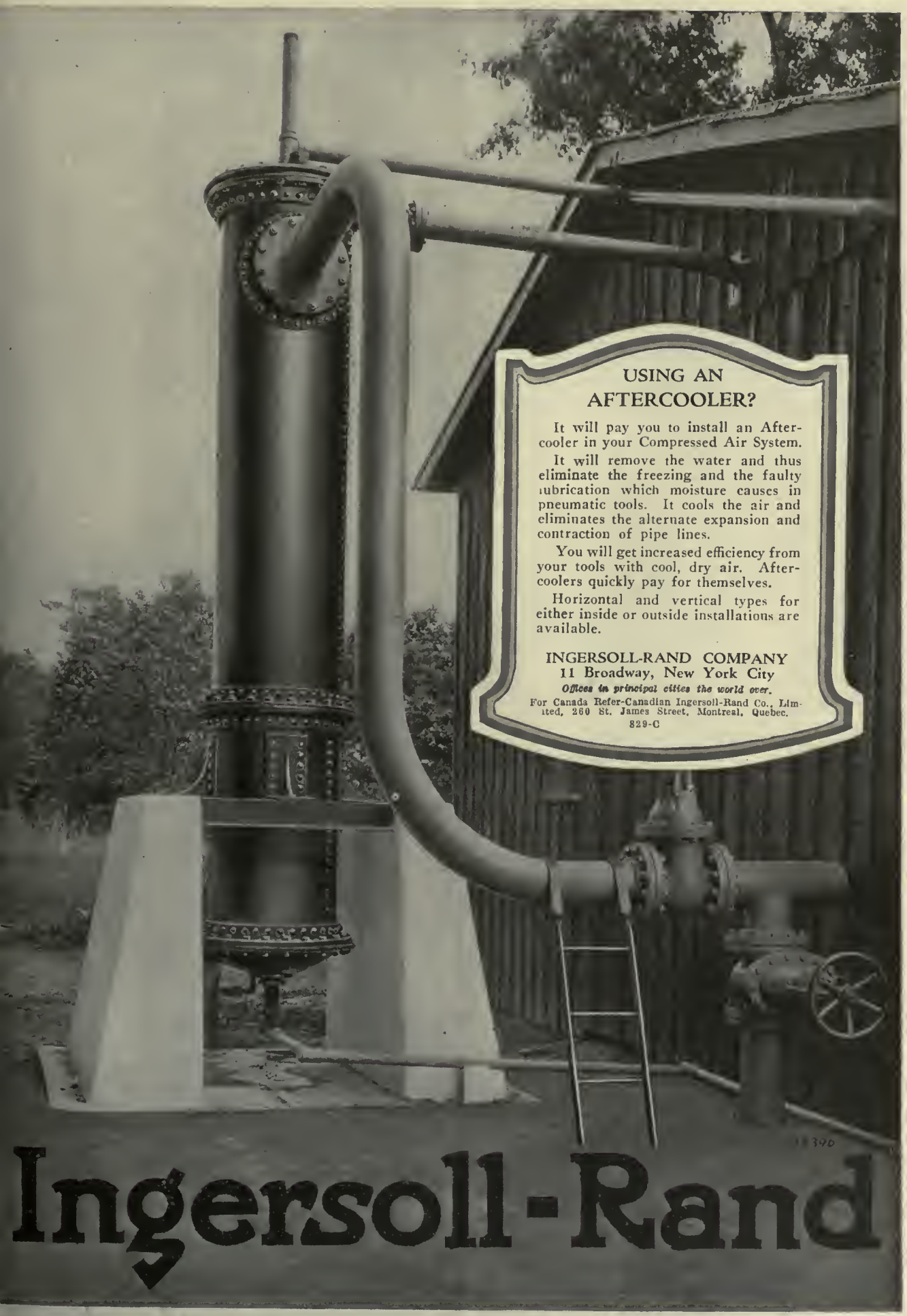
Heaters, Car, Hot Air and Water
Smith Heater Co., Peter

Heaters, Car Stove
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Helmets, Welding
Railway Trackwork Co.
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Hoists, Portable
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Irvington Varnish & Ins. Co.
Okonite-Callender Cable Co.
United States Rubber Co.
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Insulating, Silk
Irvington Varnish & Ins. Co.

Insulating Varnishes
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Electric Ry. Equipment Co.
Elec. Service Supplies Co.
General Electric Co.
Irvington Varnish & Ins. Co.
Okonite Co.
Okonite-Callender Cable Co
Westinghouse E. & M. Co.

Insulation Slots
Irvington Varnish & Ins. Co.

Insulator Pins
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Hubbard & Co.

Insulators (See also Line Materials)
Elec. Ry. Equipment Co.
Elec. Service Supplies Co
General Electric Co.
Irvington Varnish & Ins. Co.
Ohio Brass Co.
Westinghouse E. & M. Co.

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Haskelite Mfg. Corp.

Interurban Cars (See Cars)

Jacks (See also Cranes, Hoists and Lifts)
Elec. Service Supplies Co.
National Ry. Appliance Co.

Joints, Rail
(See Rail Joints)

Journal Boxes
Brill Co., The J. G.
S. K. F. Industries
St. Louis Car Co.

Lamp Guards & Fixtures
Electric Service Supplies Co.
General Electric Co.
Westinghouse E. & M. Co.

Lamps, Arc & Incandescent (See also Headlights)
General Electric Co.
Westinghouse E. & M Co.

Lamps, Signal and Marker
Electric Service Supplies Co.
Nichols-Lintern Co.
Ohio Brass Co.

Lanterns, Classification
Nichols-Lintern Co.

Letter Boards
Haskelite Mfg. Corp.

Lightning Protection
Elec. Service Sup. Co.
General Electric Co.
Ohio Brass Co.
Westinghouse E & M. Co.

Line Material (See also Brackets, Insulators, Wires, etc.)
Archbold-Brady Co.
Electric Ry. Equipment Co
Electric Service Supplies Co.
General Electric Co.
Hubbard & Co.
More-Jones Brass & Metal Co.
Ohio Brass Co.
Westinghouse E. & M. Co.

Locking Spring Boxes
Wm. Wharton Jr & Co.,

Locomotives, Electric
Amer. Brown Boveri Elec. Corp.
Cummings Car & Coach Co.
General Electric Co.
Westinghouse E. & M. Co.

Locomotives, Oil Engine, Electric Driven
Ingersoll-Rand Co.

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Manganese Steel Switches, Frogs & Crossings
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Motor Buses (See Buses, Motor)

Motor Generators
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Brill Co., J. G.
Electric Service Supplies Co.
St. Louis Car Co.
Wood Co., Chas. N.

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Bethlehem Steel Co.
Hubbard & Co.

Oils (See Lubricants)

Omnibuses (See Buses, Motor)

Oxy-Acetylene (See Cutting Apparatus, Oxy-Acetylene)

Packing
Westinghouse Traction Brake Co.

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American Asphalt Paint Co.
Johnson Paint Co., R. F.

Paints and Varnishes (Insulating)
Electric Service Supplies Co.
Irvington Varnish & Ins. Co.

Paints and Varnishes for Woodwork
National Ry. Appliance Co.

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Ohio Brass Co.

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Hubbard & Co.

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International Creosoting & Construction Co.
Naugle Pole & Tie Co.

Poles, Trolley
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Electric Service Supplies Co.
Nuttall Co., R. D.

Poles, Tubular Steel
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Electric Service Supplies Co.

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Okonite-Callender Cable Co., Inc.

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Pumps
A. S. Cameron Steam Pump Wks. (Ingersoll-Rand Co.)
Ingersoll-Rand Co. (A. S. Cameron Steam Pump Wks.)

Pumps, Vacuum
A. S. Cameron Steam Pump Wks. (Ingersoll-Rand Co.)
Ingersoll-Rand Co. (A. S. Cameron Steam Pump Wks.)

Punches, Ticket
International Register Co.
Wood Co., Chas. N.

Rail Braces & Fastenings
Ramapo Ajax Corp.

Rail Filler
Philip Carey Co., The

Rail Grinders (See Grinders)

Rail Joints
Carnegie Steel Co.
Ludlum Steel Co.

Rail Joints—Welded
Lorain Steel Co.
Metal & Thermit Corp.

Rail Welding
Metal & Thermit Corp.
Railway Trackwork Co.
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Rattan
Brill Co., The J. G.
Cummings Car & Coach Co.
Elec. Service Supplies Co.
Hale-Kilburn Co.
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Amer. Brown Boveri Elec. Corp.

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Brill Co., The J. G.
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St. Louis Car Co.

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Bethlehem Steel Co.
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Repair Shop Appliances (See also Coil Banding and Winding Machines)
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Westinghouse E. & M. Co.

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Consolidated Car Heating Co.

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Brill Co., The J. G
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Brill Co., The J. G.

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Brill Co., The J. G.
Hale-Kilburn Co.
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Brill Co. The J. G.
Hale-Kilburn Co.
St. Louis Car Co.

Second Hand Equipment
Electric Equipment Co
Sachsenmaier Co., George
Salzberg Co., Inc., H. E.

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Brill Co., The J. G.

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Brill Co., The J. G.
Hubbard & Co.

Shovels, Power
Brill Co., The J. G.

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Cummings Car & Coach Co.
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International Steel Tie Co.
Ludlum Steel Co.

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Goodyear Tire & Rubber Co.
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General Electric Co.
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Electric Service Supplies Co.
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Amer. Electrical Works
Amer. Steel & Wire Co.
American Brass Co.
Anaconda Copper Min. Co
Roebling's Sons Co., J. A

Trucks, Car
Brill Co., The J. G.
Cummings Car & Coach Co.
St. Louis Car Co.
White Co.

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International Motor Co.
Mack Trucks, Inc.

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Haskelite Mfg. Corp.

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Irvington Varnish & Ins Co

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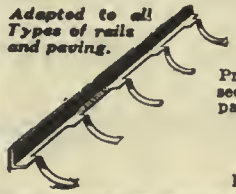
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(Continued on Page 42)





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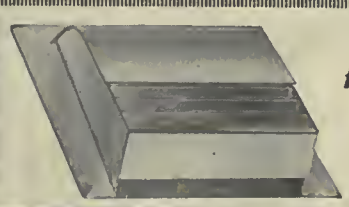
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ALPHABETICAL INDEX TO ADVERTISEMENTS

A

Page

Allison Co., J. E. 25
American Asphalt Paint Co., The. 65
American Brass Co., The 66
American Bridge Co. 62
American Brown Boveri Electric Corp. 18, 19
American Car Co. 56-57, 73
American Electrical Works 66
American Steel Foundries, Insert 34, 35
American Steel & Wire Co. 65
Anaconda Copper Mining Co. .. 66
Archbold-Brady Co. 24

B

Babcock & Wilcox Co. 65
Beeler Organization 24
Bell Lumber Co. 25
Bethlehem Steel Co. 28
Brill Co., The J. G. 56, 57, 73
Buchanan & Layng Corp 24
Byllesby Engineering & Management Corp. 24

C

Cameron Electrical Mfg. Co. 25
Carey Company, The Philip 8-9
Carnegie Steel Co. 62
Central Electric Ry. Asso. 26
Chillingworth Mfg. Co. 71
Cleveland Fare Box Co. 71
Cleveland Pneumatic Tool Co., The 20
Collier, Inc., Barron G. 16
Consolidated Car Fender Co. 71
Consolidated Car Heating Co. 71
Cummings Car & Coach Co. 55
Curtain Supply Co. ..... Insert 46

D

Day & Zimmermann, Inc. 24
Differential Steel Car Co., The .. 65
Doyle, Kitchen & McCormick, Inc. 27

E

Page

Eagle-Ottawa Leather Co., Insert 48
Economy Electric Devices Co., Insert 37
Electric Equipment Co. 67
Electric Ry. Equipment Co. 66
Electric Railway Improvement Co., The 25
Electric Service Supplies Co., Insert 41

F

Fisk Tire Co., Inc., The 15
Ford, Bacon & Davis 24
"For Sale" Ads 67

G

General Electric Co., 22, Insert 32-33, Back Cover
Godwin Co., Inc., W. S. 71
Gold Car Heating & Ltg. Co. 71
Goodyear Tire & Rubber Co., The 10

H

Hale-Kilburn Co. 71
Haskelite Mfg. Corp. ..... Insert 47
"Help Wanted" Ads. 67
Hemphill & Wells 24
Holst, Englehardt W. 24
Hubbard & Co. 65

I

Ingersoll-Rand Co., The 69
International Creosoting & Construction Co. 6
International Motor Co., Insert 11, 12, 13, 14
International Register Co. 66
International Steel Tie Co., The. 7
Irvington Varnish & Insulator Co. 66

J

Jackson, Walter 24
Jeandron, W. J. 60
Johnson & Co., Inc., J. R., 25, Insert 40

K

Page

Kelly-Springfield Tire Co., The .. 17
Kelker, DeLeuw & Co. 24
Kuhlman Car Co. 56, 57, 73

L

LeCarbone Co. 60
Lorain Steel Co. 62
Ludlum Steel Co. 62

M

Mack Trucks, Inc., Insert 11, 12, 13, 14
McClellan & Junkersfeld 24
McGraw-Hill Book Co., Inc. 61
McGraw-Hill Publishing Co., Inc. 27A, 27B
Metal & Thermit Corp. 71
More-Jones Brass and Metal Co., Insert 49
Morganite Brush Co., Inc. 25
Morton Mfg. Co. ..... Insert 50

N

Nachod and U. S. Signal Co. .. 71
National Brake Co. .... 23, Insert 53
National Pneumatic Co., Inc., Insert 42, 43
National Ry. Appliance Co. 65
Naugle Pole & Tie Co. 25
Nichols-Lintern Co. 71
Nuttall Co., R. D. 60

O

Ohio Brass Co. ..... Insert 38, 39
Okonite-Callender Cable Company, Inc., The 66
Okonite Co., The 66

P

Pantasote Co., Inc. 60
Perey Mfg. Co., Inc. 71
Positions Wanted and Vacant .. 67

R

Page

Railway Track-work Co. 5
Railway Utility Co. ..... Insert 51
Ramapo Ajax Corp. 71
Richey, Albert S. 24
Roebling's Sons Co., John A. .. 25
Rooke Automatic Register Co. . 66
Root Spring Scraper Co. .. Insert 52

S

S K F Industries, Inc. .... Insert 45
Sachsenmaier Co., George 67
Safety Car Devices Co. .... Insert 36
Samson Cordage Works 71
Salzburg Co., Inc., H. E. 67
Sanderson & Porter 24
Searchlight Section 67
Smith Heater Co., Peter 71
St. Louis Car Co. .. Insert 29, 30, 31
Star Brass Works 66
Stevens & Wood, Inc. 24
Stone & Webster 24
Stucki Co., A. 71
Studebaker Corp. of America, The ..... Insert 63, 64

T

Thomas, Perley A., Car Works .. 59
Timken Roller Bearing Co., The. 21
Tool Steel Gear & Pinion Co. .. 62

U

Una Welding & Bonding Co. 71
Universal Lubricating Co. 65

W

"Want" Ads. 67
Wason Mfg. Co. 56-57, 73
Westinghouse Elec. & Mfg. Co. 2
Westinghouse Traction Brake Co. 4
Wharton, Jr. & Co., Inc., Wm. . 62
"What and Where to Buy" 68, 70, 72
White Co., The ..... Front Cover
White Eng. Corp., The J. G. 2
Wish Service, The P. Edw. 2
Wolf Waterproof Fabric Co., L. L. ..... Insert 4
Wood Co., Chas. N. 6

WHAT AND WHERE TO BUY

(Continued from Page 40)

Varnished Papers & Silks
Irvington Varnish & Ins. Co.

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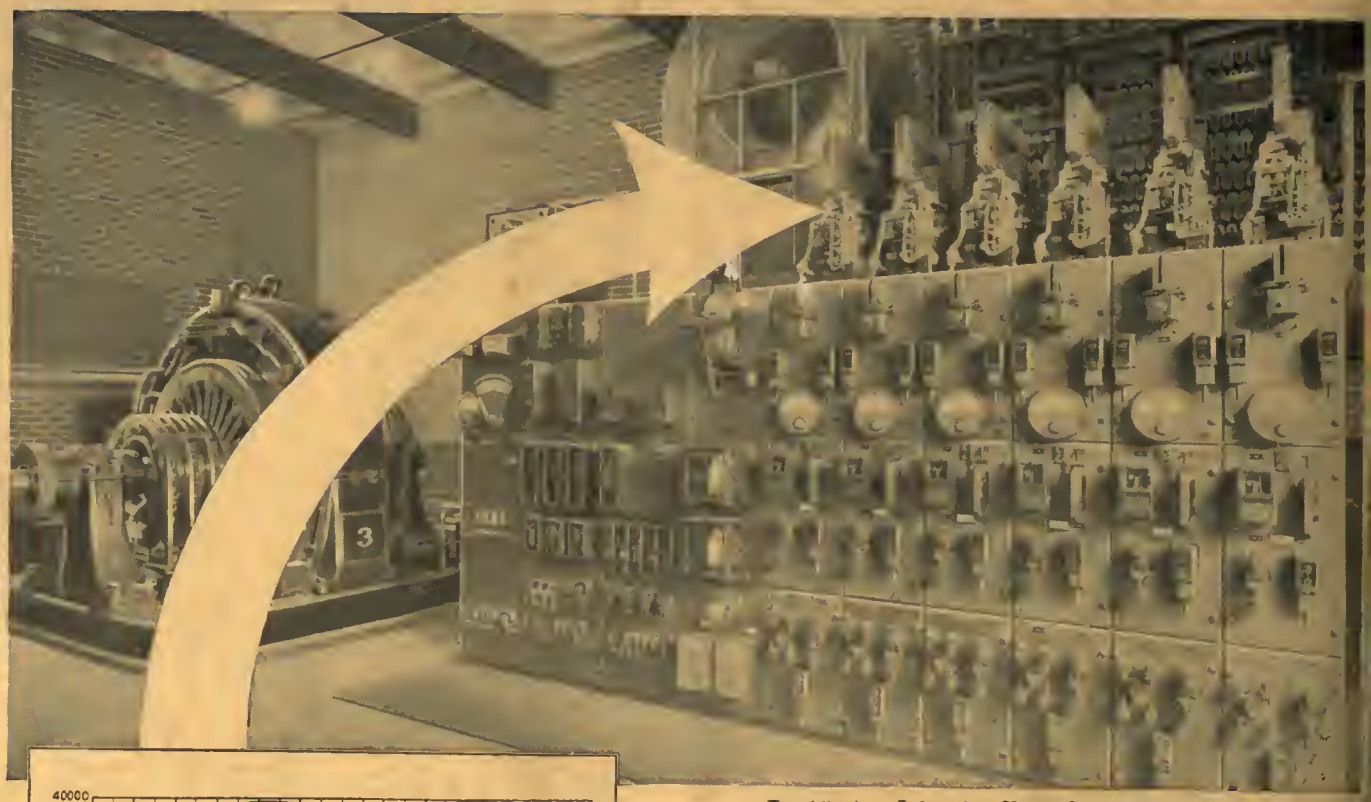
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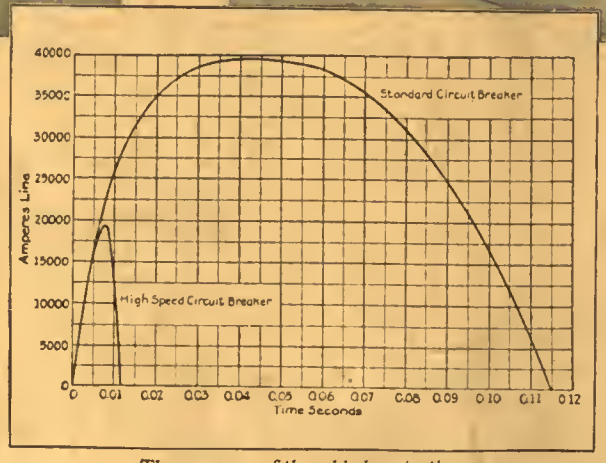
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What the addition of High-Speed Breakers adds to your substations

With the high-speed type of air circuit breaker, the total elapsed time of a short circuit from initial current rise to complete interruption is but .008 to .015 second.

Operating at such extremely high speed, these breakers open short circuits so quickly that flashovers on commutating machines are prevented. This decreases wear of commutator and brushes and practically eliminates damage from internal grounding. It also insures greater reliability and lower substation maintenance.

Bulletin 44742.1 describes the G-E High-Speed Breaker. Your G-E Office has copies.

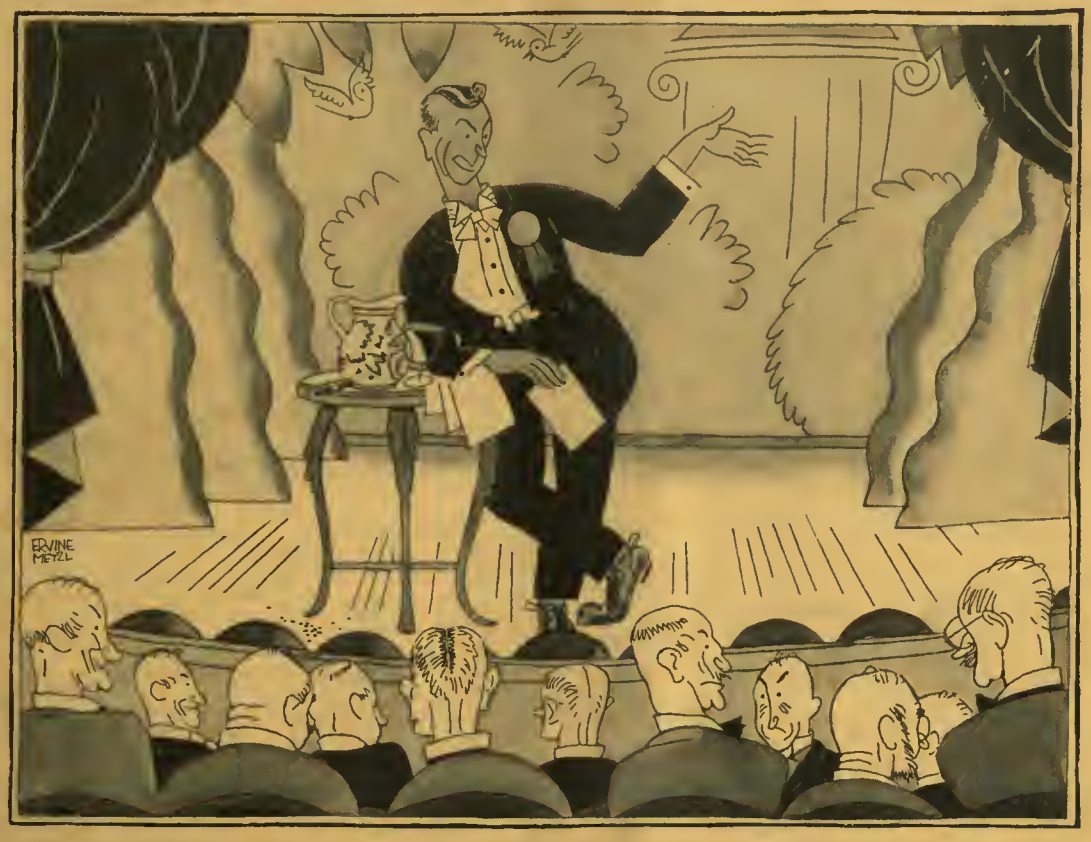
A new order of substation protection was instituted with the development of the G-E High-Speed Circuit Breaker nine years ago. During these years about 900 Breakers of this type have been installed. The High-Speed Breaker is not an experiment of recent date.

3-16

GENERAL ELECTRIC

McGraw-Hill Publishing Company, Inc. June 5, 1926 Twenty Cents per Copy

ELECTRIC RAILWAY JOURNAL



Convincing Conventions

AT THE A. I. E. E. Convention, held this month, keep an ear open for brush talk. If necessary, start some yourself. Any question will do, such as: "What brushes do you use?" The answer to that usually is a convincing "Nationals, of course." After you've had that answer at any of these three conventions—N. E. L. A., A. I. E. E. and A. I. & S. E. E.—write, wire or phone us and we'll send one of our expert Sales Engineers to prove to you how convincingly superior is the performance of National Pyramid Brushes.

National
Pyramid Brushes

Manufactured and guaranteed by
NATIONAL CARBON COMPANY, INC.
Carbon Sales Division
Cleveland, Ohio San Francisco, Cal.
Canadian National Carbon Company, Limited, Toronto, Ontario
Emergency Service Plants

CHICAGO, ILL.
551 West Monroe St.
Phone: State 6092

PITTSBURGH, PA.
Arrott Power Bldg. No. 3
Barker Place
Phone: Atlantic 3570

NEW YORK, N. Y.
357 West 36th St.
Phone: Lackawanna 8153

BIRMINGHAM, ALA.
1824 Ninth Ave., N.
Phone: Main 4016



Modern light weight cars of the Youngstown Suburban Railway operate between Youngstown and Leetonia, O.

Where Does the Modern City End?

DOES the modern city end where commerce leaves off? No. Reaching far out to green fields where roses bloom and patches of woodland dot the horizon—there are the cozy, modest homes where dwell the city's workers. For modern transportation broadens city borders. Miles that are shorter in minutes and cheaper, reach out along modern suburban trolley lines to sunshine and air. Trolley equipment has kept pace with progress. Bright, inviting cars to merchandise transportation; lighter weight for greater comfort and economy; important refinements that keep cars on the road, producing revenue—such are the tools of the modern trolley line—tools that build business and profit through helpful community service.

Westinghouse Electric & Manufacturing Company
East Pittsburgh Pennsylvania
Sales Offices in all Principal Cities of the United States and all Foreign Countries

Westinghouse

X88713

MEMBER AERA 1926

The new light-weight cars of the Youngstown Suburban Railway Company are typical of modern cars that serve progressive suburban communities. Operated as one-man cars, they maintain schedules even better than the heavier two-man cars. Each is equipped with four Westinghouse 510A motors and Westinghouse control.

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Vol. 67
No. 23

Pages
955-998

CONTENTS

JUNE 5, 1926

Editorial 955

Austria Extends Electrification 958
Two important lines on mountain sections involve serious problems in insulation and overhead line construction. Single phase at 15,000 volts and 16⅔ volts is used.

Strong Light Truck Built for Express Delivery 963
Illinois Traction System uses 1-ton Ford chassis with Plymetl sides and Haskelite roof. Exterior color scheme is orange and black.

Heavy Freight Locomotive for Silesian Mountain Railways 963

Trolley Loops Made into Parks 964

A New Local Transportation Era Is Ahead 965
By L. R. NASH.
Tendencies in regulation, franchise terms, paving requirements, taxation and rates of fare indicate improved fundamental conditions. Rapid progress toward co-ordination of various local transportation agencies being made.

Union Station Built at Sacramento 969

Bus Practices Changed at New Bedford 969

Pueblo Cars Remodeled for One-Man Operation 970
Rear-entrance-and-exit cars have been redesigned by the Southern Colorado Power Company for front-entrance and rear-automatic-exit operation.

P. R. T. Adopts Improved Selection and Training Methods for Employees 971
Psychological tests interposed into the process of selection in order to eliminate candidates who are inherently unqualified for platform or bus service. All platform men are trained in the duties of both motorman and conductor.

More Passengers with Higher Fares 975
By WALTER JACKSON.
Weekly pass helped to produce simpler and more profitable fare at Mansfield, Ohio. Through riders increased 18 per cent.

Accidents Reduced in California 976

Maintenance Notes 977

Association News and Discussions 980

Wisconsin's Experience with the Indeterminate Permit 980
By LEWIS E. GETTLE.

Engineers Debate Parking Restriction 982
Better use of existing streets rather than creation of new ones is proposed to relieve traffic congestion. Common-carrier vehicles can be used advantageously to replace private automobiles.

American Association News 983

News of the Industry 984

Recent Bus Developments 990

Financial and Corporate 992

Legal Notes 995

Personal Mention 996

Manufactures and the Markets 997

Keeping Up with the Procession

A WELL-KNOWN executive who has spent a long business life in local transportation service had this to say in a recent letter:

When I first went into the street railway business years ago I immediately subscribed to the JOURNAL and have been reading it ever since. That is a good many years ago. I have tried not to get to be a back number, and I know that I have kept abreast of the time to a large extent due to my perusal of the ELECTRIC RAILWAY JOURNAL. If all the men of the electric railway fraternity had read the JOURNAL and been governed by what has been published there, certainly many of the roads throughout the country would be in better shape today. It gives the facts to all of us who read, and if we do not profit it is our own fault.

This gracious compliment from a veteran of the industry is published with due humility and an increased sense of the responsibility with which the tremendous influence of such a reputation for wise counsel and clear vision is exercised.

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Number of Copies Printed, 5,970

Advertising Index—Alphabetical, 57; Classified, 52-54-57; Searchlight Section, 51



Service *must not* fail!

RUSH hour! Hungry, tired masses hurrying home, impatient at the slightest delay. Jammed streets—extra cars—sudden stops and quick starts—the severest test of the distribution system comes at the moment when it dare not fail!

That is just when the sturdy Westinghouse substation equipment shows its mettle. Westinghouse Converters and M-G Sets are built for severe service—built to meet unflinchingly every service requirement—built to produce power to spare, with safety.

Tonight, and every night, as rush hour approaches, Westinghouse Converters and M-G sets are taking up their share of the railway load in nearly every city in the country—a general acceptance merited by continued leadership in design and construction.

Westinghouse Electric & Manufacturing Company
East Pittsburgh Pennsylvania.
Sales Offices in all Principal Cities of
the United States and Foreign Countries

1926

Westinghouse

X88772

A Modern Trolley Base For Modern Cars



Balanced---and on Timkens

THE performance demanded of the modern car has given Master Mechanics and Overhead Superintendents the best of reasons for favoring the O-B Form 4 Timken Bearing Trolley Base. They must look to the economies of the most efficient equipment to realize fully the possibilities of new cars.

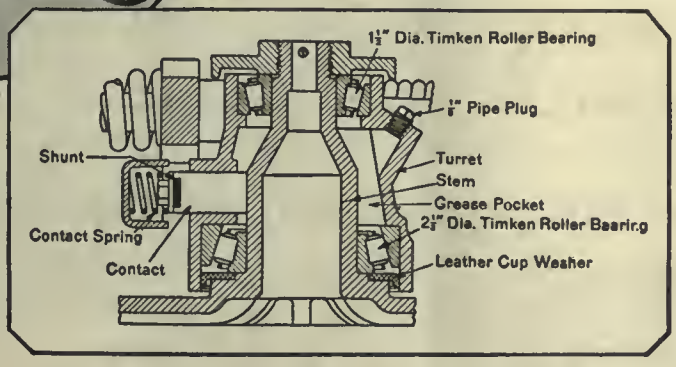
The O-B Form 4 Base lasts as long as the car, needs practically no care, and produces the minimum of wear and tear on the overhead. Its balanced spring assembly and the O-B application of Timken Bearings insure a uniform pole tension and a free and easy responsiveness to every variation of the overhead. Lost motion or wobble never develops in this base. It has a permanent perfect bearing.

Light in weight yet strong and compact in construction, O-B Form 4 Base is ideal for city and interurban cars. And its special Pedestal Contact Brush has ample capacity to carry the current necessary for operating a number of heavy electric freight cars in trains.

There are other reasons for the satisfaction which this Trolley Base has given on every railway where used. The details are interesting—write for them today.

Ohio Brass Company, Mansfield, O.
Dominion Insulator & Mfg. Co., Limited
Niagara Falls, Canada

Removal of cotter pin and cap nut permits removal of base from pedestal. A perfect application of two standard size Timken Bearings provides an ideal support for the base.

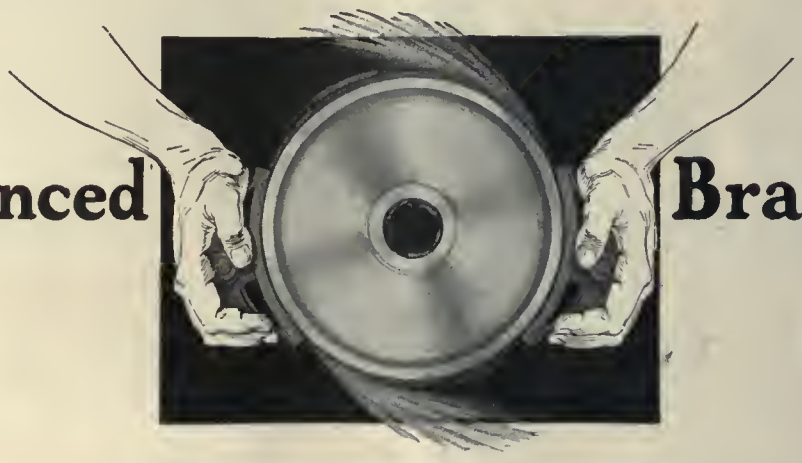


Section of Turret Bearing showing position of Timken Roller Bearings and current contact.

84C

Ohio Brass Co.

PORCELAIN INSULATORS LINE MATERIALS RAIL BONDS CAR EQUIPMENT MINING MATERIALS VALVES



Balanced Braking

Double the Braking Area—

Double it—and you decrease over 50% the required energy absorption per brake shoe.

Double the braking area and you greatly increase the friction coefficient.

Double it and you can attain a higher rate of retardation.

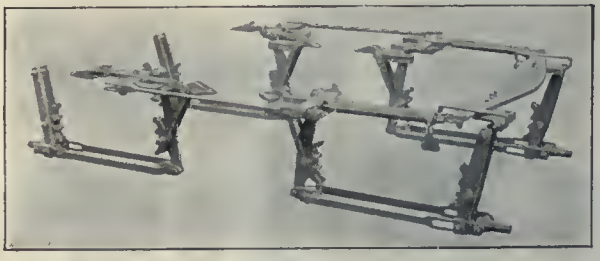
Double it and you decrease the frequency of brake shoe replacements.

The "SIMPLEX AND AMERICAN MULTIPLE UNIT" clasp brakes with two brake shoes per wheel instead of one, doubles the braking area and accomplishes these results.

AMERICAN STEEL FOUNDRIES

NEW YORK CHICAGO ST. LOUIS

American Multiple Unit Clasp Brake





Simple and Economical Paved Track Construction

NOTICE the simplicity of a Twin Tie installation illustrated by this picture taken on Broadway, the Main Street of Mattoon, Illinois—

Five men and a Foreman
A concrete mixer
A hose, tamping bars, shovels, etc.

With Twin Ties there is no gauging required—aligning and surfacing is simplified. The rail fastenings are put on with a sledge by any type of labor

The initial and ultimate cost of permanent steel tie construction is as much as $5,000.00 a mile less than wood ties.

What Shall We Send You?

Catalogue,
Quotations,
Proposal Drawing,
Estimate, 1925 Detail Costs.

The International Steel Tie Co.
Cleveland, Ohio

Steel Twin Tie Track

Renewable Track · · Permanent Foundation



Type ATF-2

ERICO

My, but *these* rail bonds are easily installed



Type ATF-2 Installed



Type AT-R Installed

Both types ATF-2 and AT-R are easy to weld. Each can be furnished with single or twin cable conductor. The type AT-R is particularly adapted to narrow bolt spacing. Similar to type AT-R is type ATR-5, with a laminated conductor, which is a splendid bond for loose joints.

Type A-2 long cable bonds are used for cross and special work bonding. You can also inexpensively increase the capacity of your present bonding by installing them around the joints.

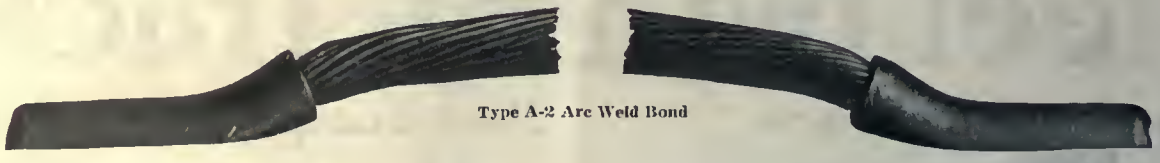
ERICO Arc Weld Rail Bonds merely require welding to the ball, or the base of the rail with the steel welding arc. The bonds fit the rail properly—no molds, no complicated clamps—just a light, portable welding outfit and one man who can do good arc welding. Only one supply required—a good grade of mild steel welding rod.

The technique of welding pieces of steel together with the electric arc is now well understood. It is not a difficult operation. Yet to make the welding of the steel terminals of ERICO Arc Weld Rail Bonds both certain and *easy*, the application of each bond type has been carefully studied by welding engineers who can and actually do arc weld.

As a result you will find that every ERICO Arc Weld Bond terminal fits the rail in a manner which gives the bonder ample room in which to manipulate his arc, and insures, with the least possible effort, a solid homogeneous weld.

Your own bonders will quickly appreciate the easy welding quality of ERICO bonds. Circular No. 13 gives a wide choice of types. Tell us to whom and where to send the samples you wish.

The Electric Railway Improvement Co.
2070 E. 61st Place, Cleveland, O.



Type A-2 Arc Weld Bond



Maintain those new cars!

To keep in constant service the thousands of new cars the industry plans to build will require a thoroughly modern and efficient repair shop. Keystone Shop Equipment fills the bill in every particular.

Send for details of the items required.

ELECTRIC SERVICE SUPPLIES CO.

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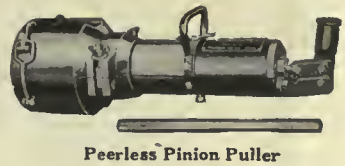
KEYSTONE *SHOP* EQUIPMENT



Peerless Coil Spreader

PARTIAL LIST OF SHOP SPECIALTIES

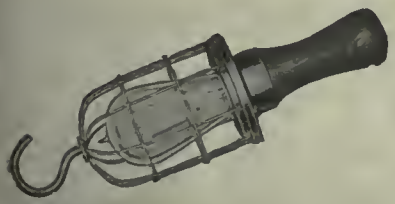
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- Peerless Coil Spreaders and Winders
- Peerless Armature Repair Machines
- Electric Baking Ovens
- Century Type Testers
- Peerless Pinion Pullers
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- Peerless Pit Jacks
- Portable Lamp Guards
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- Electric Drilling Machines
- Fountain Window Washers
- Keystone Sand Dryers
- Contact Rail Material
- Cass Commutator Stones



Peerless Pinion Puller



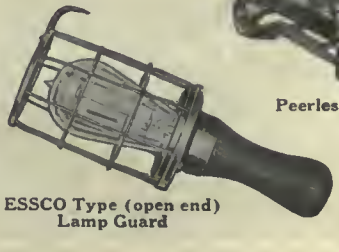
Peerless Plt Jack



New Keystone Type Lamp Guard



Type A Armature Stand



ESSCO Type (open end) Lamp Guard



Parlor Car luxury for real deluxe service



Type 15-A

Designed to meet the demand for luxurious travel comfort this Hale-Kilburn Revolving Parlor Car Chair provides luxurious comfort, yet occupies minimum floor space as it turns in a circle of 28½ to 32½ inches diameter. It has deep springs softly upholstered. Scientifically formed proportions and dimensions give perfect support and rest for the body. An ingenious device in the pedestal permits revolving with only normal effort, but prevents the chair from swaying with the movement of the vehicle.

Upholstered in leather, plush or other fabrics as desired, Pattern 15A, illustrated is especially adapted for the finest electric railway cars—Pattern 15 for de luxe buses.

Hale-Kilburn Seats of every type for urban, suburban and interurban service

From the simplest, most inexpensive standard rattan seat to the finest, most luxurious parlor car chair—you will find a Hale-Kilburn type to meet your requirements for both electric cars and motor buses.

To get complete descriptions send for our latest bulletins.

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Hale and Kilburn SEATS



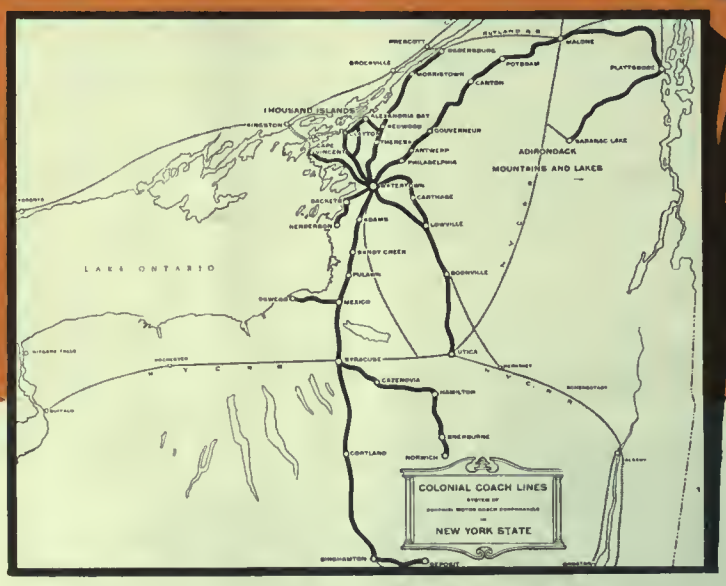
Reducing theories to practice

YELLOW KNIGHT

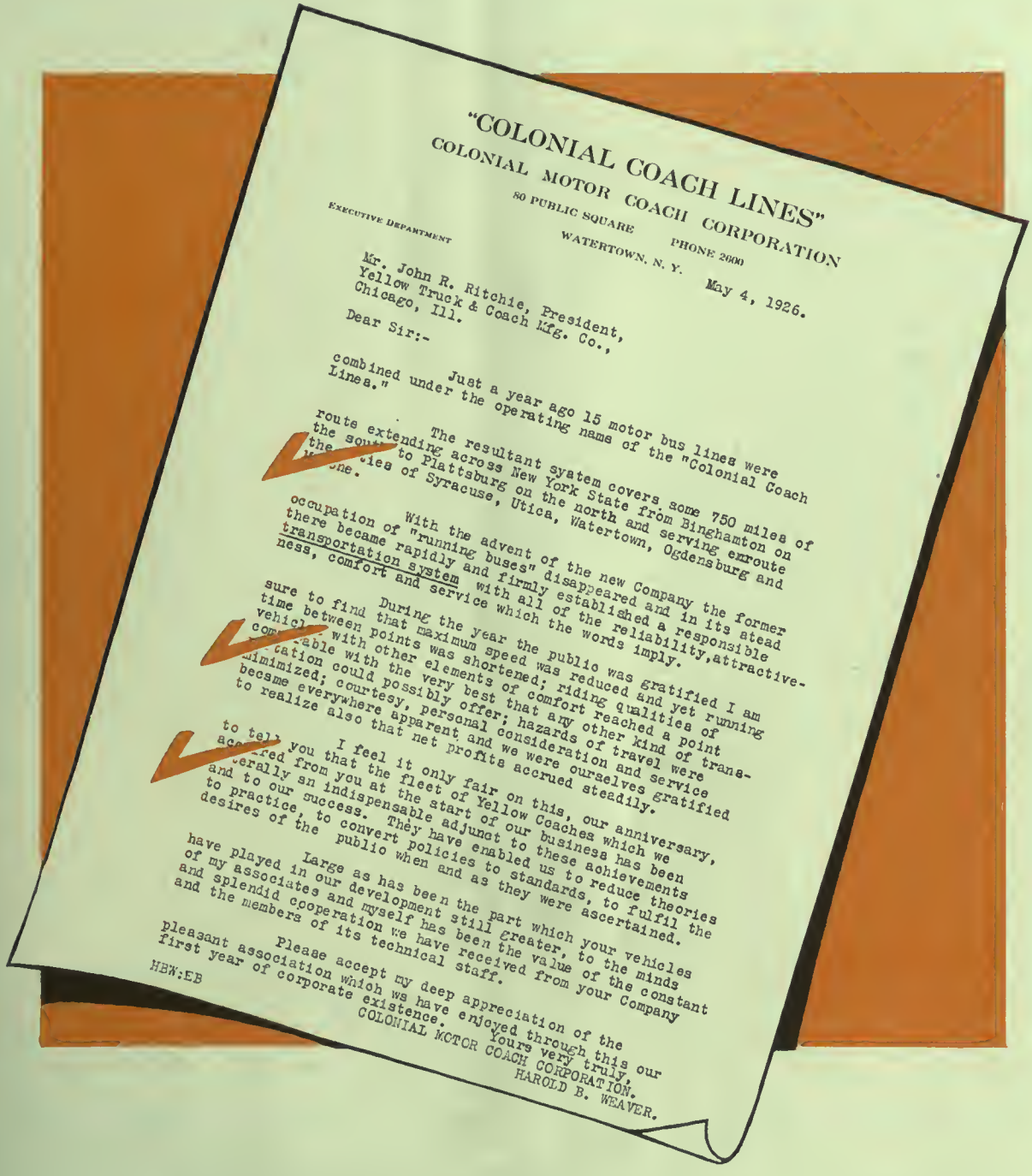
How *the* Colonial Coach Lines *are* putting Yellow Coaches *to the* acid test . . . .







After covering 882,443 miles Yellow Coaches write *their* own record *of* economical performance for *the* "Colonial Coach Lines" *at* Watertown, N.Y . . . . .



"COLONIAL COACH LINES"
COLONIAL MOTOR COACH CORPORATION
80 PUBLIC SQUARE PHONE 2000
EXECUTIVE DEPARTMENT WATERTOWN, N. Y.

May 4, 1926.

Mr. John R. Ritchie, President,
Yellow Truck & Coach Mfg. Co.,
Chicago, Ill.

Dear Sir:-

Just a year ago 15 motor bus lines were combined under the operating name of the "Colonial Coach Lines."

The resultant system covers some 750 miles of route extending across New York State from Binghamton on the south to Plattsburg on the north and serving enroute the cities of Syracuse, Utica, Watertown, Ogdensburg and Malone.

With the advent of the new Company the former occupation of "running buses" disappeared and in its stead there became rapidly and firmly established a responsible transportation system with all of the reliability, attractiveness, comfort and service which the words imply.

During the year the public was gratified I am sure to find that maximum speed was reduced and yet running time between points was shortened; riding qualities of vehicles with other elements of comfort reached a point comparable with the very best that any other kind of transportation could possibly offer; hazards of travel were minimized; courtesy, personal consideration and service became everywhere apparent and we were ourselves gratified to realize also that net profits accrued steadily.

I feel it only fair on this, our anniversary, to tell you that the fleet of Yellow Coaches which we acquired from you at the start of our business has been literally an indispensable adjunct to these achievements and to our success. They have enabled us to reduce theories to practice, to convert policies to standards, to fulfill the desires of the public when and as they were ascertained.

Large as has been the part which your vehicles have played in our development still greater, to the minds of my associates and myself has been the value of the constant and splendid cooperation we have received from your Company and the members of its technical staff.

Please accept my deep appreciation of the pleasant association which we have enjoyed through this our first year of corporate existence.

Yours very truly,
COLONIAL MOTOR COACH CORPORATION.
HAROLD B. WEAVER.

HBW:EB

"The resultant system covers some 750 miles of route extending across New York State from Binghamton on the south to Plattsburg on the north and serving enroute the cities of Syracuse, Utica, Watertown, Ogdensburg and Malone. With the advent of the new Company the former occupation of running buses' disappeared and in its stead there became rapidly and firmly established a responsible transportation system with all of the reliability, attractiveness, comfort and service which the words imply."

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and Now —

a *Study of* Colonial Coach Lines Cost *and* Operating Figures...

Watertown, N. Y., has some winters! Weather 20° and 30° below zero, snow and ice-bound roads—conditions that represent the most trying test on motor vehicles that can be imagined.

To prove Yellow Coach dependability on the road a check was made of the performance rendered by the fleet of 15 Yellow Coaches over the routes. This study was made over a six-months period, from October 1st to March 1st, when road and weather conditions were at their worst.

And how did Yellow Coaches come through?

Bucking the drifts, with icy cold in their teeth, the Yellow Coach fleet piled up a total of 364,646 miles *with only 82 involuntary stops—and these stops included every cessation of operation no matter how trivial or for how short a period.*

Out of 14,196 hours of operation *only* 55 *hours* were spent in stoppages as the total aggregate for all reason whatsoever outside of tires—a tribute to Yellow Coach ability to stand the gaff. In an operation of a standard of about 130 miles per day, in 3,000 days of operation (which is the equivalent of about $7\frac{1}{2}$ coach years), only 55 hours were lost.

As an example of individual coach service, Coach No. 206 stopped twice only for a total of thirty-five minutes *in* 26,612 miles. Impassable road conditions cut off the fleet from inspections for long periods—*but Yellow Coaches kept going!*

Maintenance costs over the same period show equally strong records.

The total cost of the material for the *complete maintenance* of the vehicles over this operation of 364,646 miles, including inspections and repairs *amounted to only* $0.0239 *per coach mile.*

These are figures that talk, when back of them is heavy going in deep snow, and over rough and icy roads. No major breakdowns of any sort occurred and there was complete absence of accidents of any sort due to defects of the vehicles.

Yellow Coaches write their own records on the road. Such records are reflected in *low-cost, profitable miles.*

YELLOW TRUCK & COACH MANUFACTURING COMPANY
SUBSIDIARY GENERAL MOTORS CORPORATION
5801 WEST DICKENS AVENUE, CHICAGO, ILL.



WASHINGTON AVENUE AND 7TH STREET, ST. LOUIS.

NP

"Keep Moving"

A slow moving transportation vehicle is no more to be tolerated these days, than street corner idling. St. Louis cars and cars in every other modern center are equipped with National Pneumatic Door and Step Operating Equipment which cuts down their standing time and keeps the traffic moving.

NATIONAL PNEUMATIC COMPANY

Executive Office, 50 Church Street, New York

General Works, Rahway, New Jersey

MANUFACTURED IN

CHICAGO
518 McCormick Building

TORONTO, CANADA, BY
Railway & Power Engineering Corp., Ltd.

PHILADELPHIA
1010 Colonial Trust Building



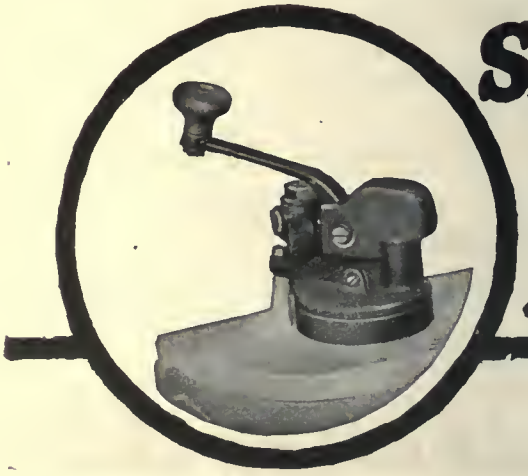
Light weight double truck Safety Car operated by the city of St. Petersburg Fla.

THE SAFETY CAR—

—is an exemplification of modern safety and economy in street railway equipment.

Safety Car Control Equipment interlocks the power, brake and door control functions to combine ease and convenience of operation with positive safety. Greater convenience is realized because both brakes and doors are controlled by the manipulation of a single operating handle, and because selective door control is possible. Greater safety is assured because careless or promiscuous door opening is prevented, the car must be stopped before the doors can be operated, the doors must be closed before the car can be started, and release of the controller handle, through motorman's negligence or disability, cuts off the power and applies the brakes automatically.

Safety Cars bridge the gap between ordinary precaution and positive safety, stimulating public appreciation through the medium of safe, adequate, accelerated service that follows with the obvious economic advantages of Safety Car installations.



SAFETY CAR DEVICES CO.
OF ST. LOUIS, MO.
Postal and Telegraphic Address:
WILMERDING, PA.
CHICAGO SAN FRANCISCO NEW YORK WASHINGTON PITTSBURGH



Peak Hour Economy

During peak hours, effective operation of ordinary brake equipment on modern light weight cars is diminished with the loading of commuting crowds—just when adherence to schedules is of the utmost importance. This condition is remedied by the

WESTINGHOUSE VARIABLE LOAD BRAKE!

During peak hours, schedules must be fast and consistent, especially through congested districts, to command passenger good will and patronage. This means that maximum speed must be maintained longer between stops than is possible without the

WESTINGHOUSE VARIABLE LOAD BRAKE!

During peak hours, every traction company counts its minutes saved collectively in terms of dollars. You can Save Money At Every Stop and get the utmost out of your rolling stock by using the

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WESTINGHOUSE TRACTION BRAKES



Many start but very few finish—

During the running of a good stiff steeplechase many a horse and rider fall by the wayside. They lack the ability and durability to stand this most gruelling test. Only the select ever finish the race.

And in the same way many a brake part fails to meet the severe requirements found in railway service.

But the Boyerizing Process to which Boyerized Parts are subjected enables them to last three to four times longer than ordinary steel parts.

Let them prove their ability by selecting and trying a few Boyerized Parts on your cars.



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- Manganese Truck Parts
- Bushings
- Bronze Bearings
- McArthur Turnbuckles

BEMIS CAR TRUCK COMPANY

Electric Railway Supplies

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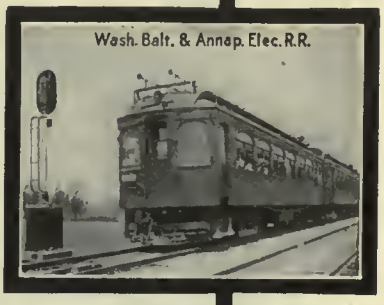
REPRESENTATIVES:

Economy Electric Devices Co., Old Colony Bldg., Chicago, Ill.
F. F. Bodler, 903 Monadnock Bldg., San Francisco, Cal.
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and their Diversified Applications.

Have you more than scratched the surface to uncover available means of protecting and speeding up your traffic, and are you experiencing delays or perhaps accidents which might be eliminated by the use of one or more of the following means?





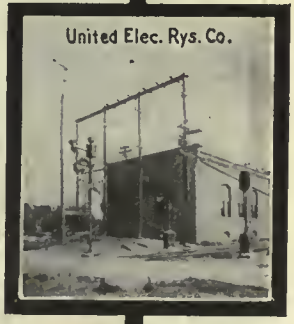
1.—Automatic semaphore or color light block signals, controlled by continuous track circuits.

2.—Electro-pneumatic, electric, electro-mechanical, or purely mechanical interlocking systems at terminals or at grade crossings with other railway lines.

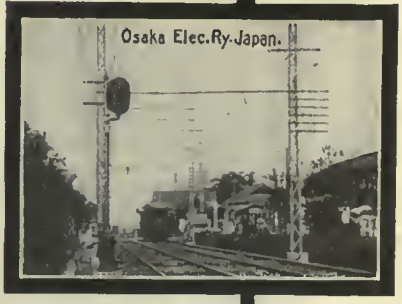
3.—Highway crossing protective devices of flashing color light, wigwag and audible types or combination of same.

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A statement of your problem places you under no obligation and if it appears to our engineers that your conditions can be improved by installation of our materials, we shall be glad to furnish complete details.

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The Bus as you buy it—

Wherever heat treating is required Mack Does it

Mack takes no chances.

To control serviceable operation of the Mack bus on the road, Mack controls the processes which are so responsible for Mack performance.

For example—

Mack does more heat treating than anyone in the industry, and uses exceptional care in every operation.

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Processes like these, in practice at each of the three Mack factories, assure the kind of service to Mack owners that is measured in profitable mileage.

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More than one hundred direct MACK factory branches operate under the titles of: "MACK MOTOR TRUCK COMPANY," "MACK-INTERNATIONAL MOTOR TRUCK CORPORATION," and "MACK TRUCKS OF CANADA, LTD."





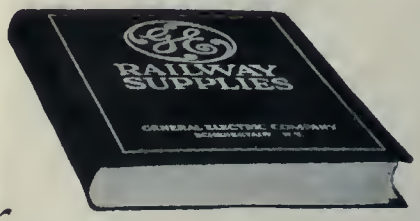
Malleable Iron—and thoroughly modern *for the* GE-265 Motor

This gear case possesses a unique feature—an overlapping joint, something new in malleable-iron gear case construction.

Overlapping of the halves keeps out dirt and moisture and affords a means of making adjustments to compensate for any wear of the supporting brackets.

This new gear case embodies the acknowledged advantages of malleable iron—rigidity and strength—yet its weight is no greater than that of the gear case formerly used with this modern light-weight motor.

General Electric is always striving to produce the most satisfactory railway equipment, as demanded by changing conditions and improvements in the industry. This new development, which makes possible the use of malleable-iron gear cases with GE-265 Motors, is a typical example.



For Modern Equipment Standards

54C-3

GENERAL ELECTRIC

Electric Railway Journal

Consolidation of Street Railway Journal and Electric Railway Review

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CHARLES GORDON, *Editor*

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Interpreting Courtesy in Dollars and Cents

UNSATISFACTORY relations between utility management and its customers has been cited as sufficient reason for refusing an increase in rates. This unusual stand was recently taken in a decision of the California commission, which stated that the attitude of representatives of the company during the hearing was such as to lend color to the charges made by customers concerning the character of the business dealings of the applicant with them. "The evidence shows," the decision read, "that at the time of the hearing there were many prospective customers who were not using gas and that certain customers had ceased using gas because of unsatisfactory personal relations with the utility."

The order further pointed out that a sincere effort on the part of the owners to give satisfactory service and courteous treatment to customers would undoubtedly result in an increase in business and a thoroughly satisfactory return. Before renewing its application the company would be required to make a more satisfactory showing of improved public relations.

So evident is the moral of this unfortunate experience that it requires little comment. It is but another illustration of the saying that courtesy pays and discourtesy is likely to bring its own penalty.

Mr. Cobb Is Demonstrating His Faith

MANY expressions of faith in the electric railway industry have been made by men high in its councils. Words of encouragement from important executives help to stimulate operating officials and their staffs to greater effort in meeting the daily operating problems, particularly on properties where the immediate margin between income and expense is lean and doubtful. Conditions in the industry, viewed in perspective, show a most encouraging trend, but it requires the continued assurance of those who see things as a whole to revive the spirits of the men immersed in the routine of an individual property.

It is, however, far more reassuring when expressions of confidence in the essential soundness of local transportation as an industry are backed with the courage to send good money after bad to provide the physical equipment and facilities with which to offer needed improvements in service. Consequently, the words of B. C. Cobb, vice-president Hodenpyl, Hardy & Company, Inc., and chairman of the Electric Railway Advisory Council, in a recent talk before the Rotary and Allied Clubs in Akron, Ohio, are particularly timely. "I have not," said Mr. Cobb, "lost faith in the electric railway business, for I am certain the people cannot do without electric railway service."

Similar statements have been made by others. In many cases the speakers have likewise occupied positions of authority and responsibility which give their words the weight of mature judgment. But in the light of the policy followed on the properties whose destinies he guides, Mr. Cobb's statement commands additional attention. In this same light, his expression of faith is tempered with keen business foresight. Mr. Cobb not only expressed his confidence in the electric railway industry, he is demonstrating it!

He is demonstrating it in Akron, the rubber city, and his demonstration has just given unreasonable labor leaders the most serious setback they have experienced in years. In Grand Rapids street railway history is being made. In Chattanooga, Nashville and Evansville new cars are destined to put the railways in an entirely different position before the eyes of the public. He has made of the bus an ally instead of a competitor, and it proved a very valuable ally indeed in the recent strike in Akron. Mr. Cobb has not done all these things. But he has made them possible. He is helping to build confidence and determination in the mind of every progressive executive in the industry.

Ancient Jurist Throws Light on Franchises and Certain Permits

IT SEEMS a far cry from the times of George III to the present, but Blackstone's definition of a franchise was quoted in a decision by the Nebraska Supreme Court in March, with others, to determine whether a permit to operate buses between fixed termini in Omaha was or was not a "franchise." The modern use of the word "franchise" in connection with the operations of public utilities may have given some people the idea that it is of recent derivation. Actually, its use goes back to the Middle Ages, when it implied a royal privilege in the hands of a subject. Blackstone's definition, written about 1765 and slightly condensed, is as follows:

"A franchise is a thing of interest and assignable and transferable. But a license is only a privilege to a certain person to do an act with impunity. When the King grants a market, he creates and grants a real thing; but when he gives liberty to trade, he does not create or grant a real thing, but only discharges or prevents a penalty inflictable for trading without leave."

The application of this principle in Omaha occurred because the city authorized the operation of certain bus lines without requiring this action to be approved by popular vote, as the law requires in the case of a "franchise." But in the ordinance, as passed, the city reserved the right to modify the provisions of such permit or to revoke it entirely, without redress or damages by the common carrier affected.

In its decision upholding the right of the city to grant these permits against the protest of the railway company, the Nebraska Supreme Court (208 N. W.

Rep., 123) declared that the ordinance permitting the use of motor buses to operate over certain routes as common carriers within the city "must be construed, not as a grant, but a regulation of a right pre-existing." In defense of this position, the court quoted the definition of a franchise already given, as well as definitions by other authors and by the United States Supreme Court. It then went on to declare that in view of its provisions the ordinance was simply the exercise of a power already existing in the city to regulate the traffic on the streets, even though the permit under which the buses operated as common carriers had many of the characteristics of a regular franchise.

Obviously, the same view may not be taken in other states. Thus, California takes the position that any use of the public highways of the state for commercial purposes is a privilege which can be permitted to some users and withheld from other persons at the pleasure of the Legislature of the state. Under this ruling, the right of the Legislature to define common carriers and specify the use they can make of the highways has been confirmed by the California Supreme Court.

If Louisville Would Achieve Its Ambition

LOUISVILLE hopes to achieve greatness. That is a laudable desire. Nobody will be found to quarrel with the city on that score. But it is trying to achieve that end while at the same time disclosing a disposition to hamstring its street railway. The two do not go together. Cities do not grow despite their street railways. They grow because of them. A starved creature of any kind is a pretty poor recommendation for its keeper. The city that starves its street railway in the sense that it is too parsimonious to permit its railway to grow and expand deserves the stigma that attaches to the emaciation which its railway is sure to reflect in the extent and character of the service that is supplied.

All the Louisville Railway wants is a fare that will permit it to grow. And it is entitled only to that. So far as the company is concerned it can get by on its present rate. But getting by is not the end of things. Nobody worth while subscribes to any such doctrine. And the Louisville Railway is very much worth while—much more worth while to the city than it is to itself, which in the last analysis is the stockholders.

Money for investment has to be attracted into the channel that gives promise of return commensurate with the risks involved. That is elementary, but it is fundamental. It is a truism that Louisville needs to ponder and reflect. That city should consider the recent experiences of Cleveland and Dallas, in both of which constructive amendments to franchise grants have been made after a vain attempt to evade the simple mathematical formula that nothing from nothing leaves nothing.

The old story holds true of the fellow who equipped his horse with green goggles and then fed him on shavings. The horse died. Boosting Louisville industrially will do no good if its street railway reflects emaciation imposed from without. All the railway asks is that the city be just, not generous. The day of inordinate profit in the public utility field—and as a matter of fact even that idea has been greatly overworked—has gone, never to return. This is not something that is debatable. It is a fact. Business men of Louisville appear to sense and appreciate this. It is high time that others also began to see the light. Until they do Louisville may carry on, but it will never achieve the civic, industrial or social heights to which it justly aspires.

Far-Sighted Management Needed to Prevent Unwarranted Destruction

EVEN though the electric railway industry as a whole has turned a corner in its progress there are still many individual properties so hopelessly involved that their continued existence is extremely doubtful. The unfortunate situation is that these backward properties cast unwarranted reflections on the industry at a time when the general public and many more closely identified with the industry find it all too easy to throw up their hands.

There comes to mind a property once taking in $1,000,000 gross annually. It was financed badly and operated by its directors with the ultimate hope of selling at a profit. It had many bond issues. These were allowed to exist without making provision for retirement or for refunding. The management was more interested in finance than in service, and the public relations suffered until the property had little or no standing in the community it served and from which it drew its revenue.

Then the fight for bus supremacy came. The property did not have the help of the community because it had not deserved it in the early days. Even though the management changed hands the old stigma remained. Justly or not, the reputation seems to remain firmly attached to the physical property rather than the personnel or its ideals. Again, the state public service commission was poorly advised by one of its employees, and an independent got a permit to operate competitive bus service through a tragedy of errors. In all too brief a time the buses gained a third of the railway revenue. This was done in the usual manner of taking a great part of the base load away from the railway and leaving the unprofitable surplus peaks for it to handle.

Receivership followed in the early stages of this competition, after which still further losses of riders to the buses took place. This made it impossible to maintain a satisfactory cash position without too great a curtailment of maintenance expenditures. What chance exists for a reorganization plan among interests that have no concern with transportation or service? The bondholders' committees representing the several underlying issues are only concerned with recovering their own money. Some of the smaller issues are the senior securities on certain sections, and unless they can be paid off at par their owners see an opportunity to get out whole through the sale of their portion of the rails and cars for scrap. Transportation means nothing to them; service to the community is of no interest. Nor can they be blamed for this viewpoint. It is just an unfortunate result of a failure to grasp the situation in time. Today, the whole system, once a successful property, may go on the junk pile at 10 to 20 cents on the dollar and the communities served will lose a valuable servant.

The burden of providing with buses all the transportation requirements of the community throws the mantle of responsibility on new and inexperienced shoulders. This is an entirely different situation than

that of carrying only the cream of the traffic built up through a quarter of a century or more. The outcome will be interesting, but the experiment may prove costly to the community at a time too late to retrace its steps. The newspaper headlines will say "Railway Abandons Service" or "Buses Supersede Obsolete Railway." "Wrecked by Poor Management and Uninformed Public" would more accurately reflect the facts.

Buses Do Their Bit in Akron

IN THE case of an agency so new and undeveloped as is the bus in the transportation field it is dangerous to draw sweeping conclusions from experiences in isolated instances.

Akron now occupies the center of the bus stage again. This time the bus has more than held its own in furnishing an emergency service that went a long way toward breaking the back of the recent street railway strike. Even before the strike, almost an equal number of street cars and buses were in use. During the early stages 210 buses were run for emergency purposes, 58 of which were in interurban service. In addition, 100 trucks were being used by the local railway to handle its freight and express.

Thus it becomes evident that discussion of the physical capacity of buses to handle the transportation requirements of cities of one size or another leads nowhere. In the previous strike, unorganized bus service failed miserably. In the present emergency, better organization and better equipment permitted them to make a much better showing. The first attempt was an effort by an uninformed city administration to prove that buses could furnish transportation service at a 5-cent fare when the railway claimed that adequate public transportation required a higher rate. This second emergency use of the bus was to maintain transportation service on the part of an organized and responsible agency in the face of an unwarranted refusal by its car employees to continue their work.

Many unwise sweeping conclusions as to the physical limitations of bus service were drawn from the previous Akron experience. The proper place of the bus and the car will be settled on economic grounds. The question of physical capacity is and always will be a secondary one. There has been too much loose talk on both sides of the bus-car question and too little sincere effort to determine and develop the field for each vehicle.

Too Much Caution and Not Enough Speed

SO MUCH prominence has been given in the last few years to the "safety first" idea that the perspective of some railway operators has become distorted. The continual preaching of "safety first" sometimes has instilled a spirit of over-cautiousness, which has resulted in too great a reduction in the speed of car operation.

From the humanitarian standpoint, safety can hardly be overdone. No effort is too great to avoid accidents resulting in personal injury. It is not so much from this source, however, that the impetus for safety campaigns on the electric railway has come as it is from the desire to reduce the money cost of accidents. A minor collision may require the payment of damages for a bent mudguard or a broken windshield of somebody's automobile. In the aggregate, these payments often amount to a sizable sum, even for a railway of medium size. Claim departments have made tremendous, and frequently very successful, efforts to cut down expenditures of this sort.

In the accomplishment of this end, however, another element of primary importance may have been lost to sight. The public demands speed. If electric railway service is slow, people will seek other means of transportation—safe or otherwise. Loss of revenue from this source easily may amount to more than the saving made by the claim department.

To get away from the tendency to sacrifice speed to cautiousness, it is not necessary to operate the car along the streets like a juggernaut. This was not done before the advent of the automobile and the consequent safety campaigns, nor need it be done now. A car can be operated speedily while under reasonable control. The motorist should exercise his share of caution, too, not leaving it to the railway to do all the thinking about safety. By this means, the transportation service will be improved and the accident hazard will be reduced rather than increased.

Who Is to Blame for Failure of Effective City Planning?

CONCERNING comprehensive plans for civic improvements, particularly those involving transportation facilities, it might be aptly said that many are made but few are carried out. Why is this so? Usually, it is in part the impracticability of the proposed plans that prevents their execution and in part the difficulty of overcoming the inertia of things as they are.

Often the theorists and the realists fail to get together because neither group realizes the importance of the other. The civic planners have a tendency to consider the practical transportation men as "lowbrows," and the latter reciprocate by regarding the planners as impractical "highbrows."

It is all very well to make idealistic plans for future transportation facilities, but first they must be built and then they must be operated. That means that they must be feasible from the construction standpoint and reasonably promising from the financial standpoint. Ideas of the experienced local transportation men usually will be found invaluable in mapping out a sound, practical program. Those charged with the preparation of plans for the future make a serious mistake by not availing themselves to the full of this fund of useful information.

On the other hand, it must be admitted that many transportation men fail adequately to appreciate the value of what the planners are doing. They are skeptical about so much theoretical discussion. Such an attitude is a mistake, too. While the plans may be imperfect, they are, nevertheless, an attempt to regulate development in the right way rather than allowing it to proceed haphazard. Much of our existing congestion could have been avoided by careful planning years ago. Planning now for the future is absolutely necessary if our next state is not to be worse than our present.

For best results, therefore, the theorists and the realists must work together. The latter will temper the plans with common sense and the former will instill a touch of idealism which should eventually result in greater achievement.



This Latest Division of the Austrian State Railways to Be Electrically Equipped Passes Through a Section of Wonderful Scenery

Austria Extends Electrification

Two Important Lines on Mountain Sections Involve Serious Problems in Insulation and Overhead Line Construction—Single Phase at 15,000 Volts and 16⅔ Cycles Is Used

WHILE Austria as a country is much smaller than it was, it has gone courageously ahead with the electrical equipment of those portions of its State Railways for which the advantages of electrification are especially pronounced. One principal reason for this policy, of course, is the abundance of water power in the mountains of Austria, especially in those portions of the Alps in the southern and western parts of the country toward Switzerland and Italy.

Two of the latest divisions of the Austrian State Railways to be equipped with electric power are the Arlberg line and the Salzkammergut line. Both traverse mountain ranges and have extended tunnel sections. Their locations are shown on the accompanying map. In the following account of these lines information has been combined, received from the railway authorities and from an article in *Electrotechnik und Maschinenbau* by Ing. Hugo Luithlen of the electrical department of the Austrian State Railways.

The Arlberg Line Part of a Through Route

As will be seen, the Arlberg line connects Innsbruck in the Tyrol and all of Austria east of that city with the extreme western part of the country which borders on the upper Rhine Valley and on Lake Constance. Thus this line forms a part of a through route from Vienna to Switzerland and thence via Zurich and Basel to Paris and London. This line was opened with steam as a motive power in 1884, when the 6½-mile tunnel under the Arlberg (a mountain in the Austrian Alps) was completed.

With the improvements made in electric traction, its merits and economy for an installation of this kind became increasingly apparent. Finally contracts for the electrical equipment of the Arlberg line from Innsbruck to Bludenz were awarded. As the electrification was for a section of track already built, the work required to complete the necessary hydro-electric power development took the longest time, but in 1925 the undertaking was finally accomplished. The time-table for the summer season of 1925 provided for a de luxe train via this route, running three times a week, with through cars from Vienna to Paris and Calais, with a running time between Vienna and Paris of 25 hours. In addition there were five passenger trains daily each way over this route, three of them carrying through cars scheduled as far west as Zurich and Paris, with an equal number of trains going east, carrying through cars as far as Vienna, Warsaw and Budapest.

The distance from Innsbruck to Bludenz is 136 km. (85 miles). Measured as single track the division consists of 196.1 km. (123 miles).

Hydro-Electric Power Station

The hydro-electric power station for this section, known as Spullersee Station, is located in the Vorarlberg region at the western end of the line and utilizes a head of about 2,880 ft. from Spuller Lake. The sta-

tion contains at present three 8,000-hp. units and has a capacity for twice that output. The second station is at Ruetz, south of Innsbruck, and toward the eastern end of the line. It was built for commercial purposes before the electrification of the Arlberg line, but has been extended so as to supply the additional power required, particularly in the summer, by the Arlberg Railway. Its capacity is 8,000 hp. The two stations are connected electrically by a tie line with a voltage of 55,000.

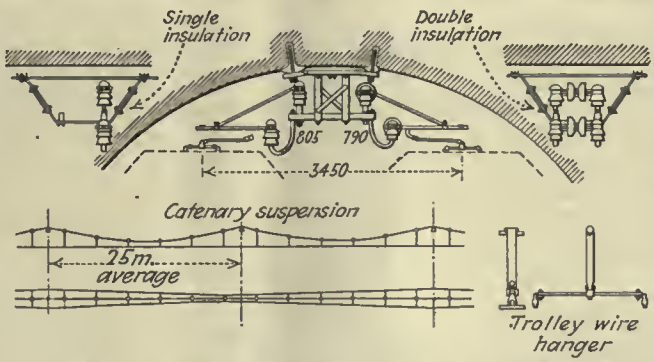


Diagram of Construction in the Tunnel. The Dimensions Are in Millimeters

It is at this voltage that single-phase, 16⅔-cycle energy is distributed to the four substations.

Transmission Lines

Located as these power lines are in the Alps, at altitudes varying between 3,000 and 6,600 ft. above sea level and traversing regions subjected to the most severe winter climate, some unusual methods of construction and maintenance had to be used.

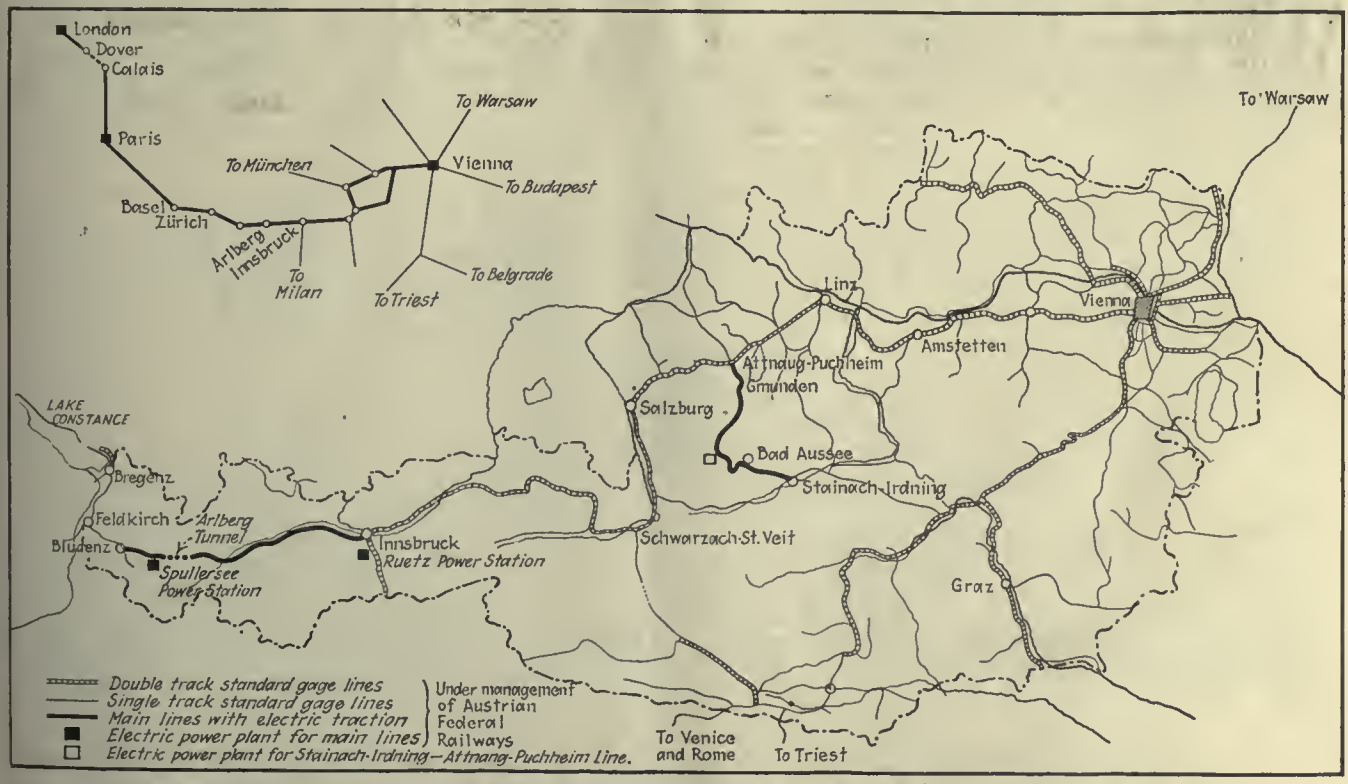
The transmission lines are carried for the most part on steel towers, set in concrete block foundations, but to some extent reinforced concrete poles of double-T cross-section are used. With these latter poles, a special hole was left in the web of the pole at approximately its center of gravity, so that with the aid of a special portable hoist the setting of these poles was much simplified.

The average spacing of the towers on level sections is 500 ft., with the transmission wires 16½ ft. apart, but this spacing of the wires was increased to 26 ft. in the long spans of 800 ft. Suspension insulators of three or four units were installed on the majority of the towers. These insulators, before being installed, were tested with 110,000 volts under oil and 125,000 volts in the air. Mechanically, the type of insulator used has a strength of 7,500 lb. Wherever highways, railways or rivers had to be crossed a double set of insulators was employed for each transmission conductor.

Part of the transmission line is carried at a considerably higher altitude than the railway, because when the tunnel under the Arlberg is reached the transmission line is carried over the mountain rather than through the tunnel. This was done because experience with underground cable construction had not been advanced sufficiently at the time of the construction of this line to warrant the engineers in recommending the use of a cable built for 55,000 volts. In consequence, the transmission line reaches an altitude of 6,600 ft.

Unusually heavy steel towers, most of them on concrete foundation rising to a height of 12 ft. above the ground, were installed on this section of the line. Experienced mountain guides were consulted by the erection engineers, so that the towers would be placed at points where there was a minimum of avalanche danger. The average distance between towers was here reduced to 450 ft., and some of the line sections are so steep that two adjacent towers which are 550 ft. apart have a difference in elevation of 340 ft.

To withstand safely the high winds and heavy sleet to which this line is exposed bronze wire was used with suspension insulators having a mechanical strength of 17,000 lb. The Austrian rules on safe line construction prescribe that a transmission line must withstand



Though Restricted in Territory, Austria Is Carrying Forward Main Line Electrification. Two Important Divisions Recently Electrically Equipped Are Shown on This Map

a wind pressure of 125 kg. per square meter, but on this installation the possible strain used in the calculations was increased from 125 kg. to 150 kg.

The maintenance of this mountain section of the transmission line has been intrusted to picked crews of linemen, all of whom are expert on skis. They have their headquarters and keep their maintenance supplies in a hospice located near the top of the Arl Mountain.

Over the entire length of the line a stranded steel wire is carried for lightning protection.

Distribution at 15,000 Volts

Each substation is equipped with two single-phase, 55,000/15,000-volt transformers, and it is at the latter voltage that the single-phase energy is put on the overhead lines.

Each of the four transformer stations supplies its own section of overhead line. At the end of each section are circuit breakers, by which one section of overhead line and its parallel feeder may be separated from those of the adjacent section. In addition, the overhead line at each of the 25 passenger stations along the route is so connected that the section at the station may be cut out of circuit in case of local trouble, the continuity of the general line being preserved by a jumper line installed around the passenger station. All of the electrical switches for this sectionalizing at each passenger station are in a special switching tower, which is kept doubly locked. The inner lock is so arranged that its key can be withdrawn only when the switches are opened.

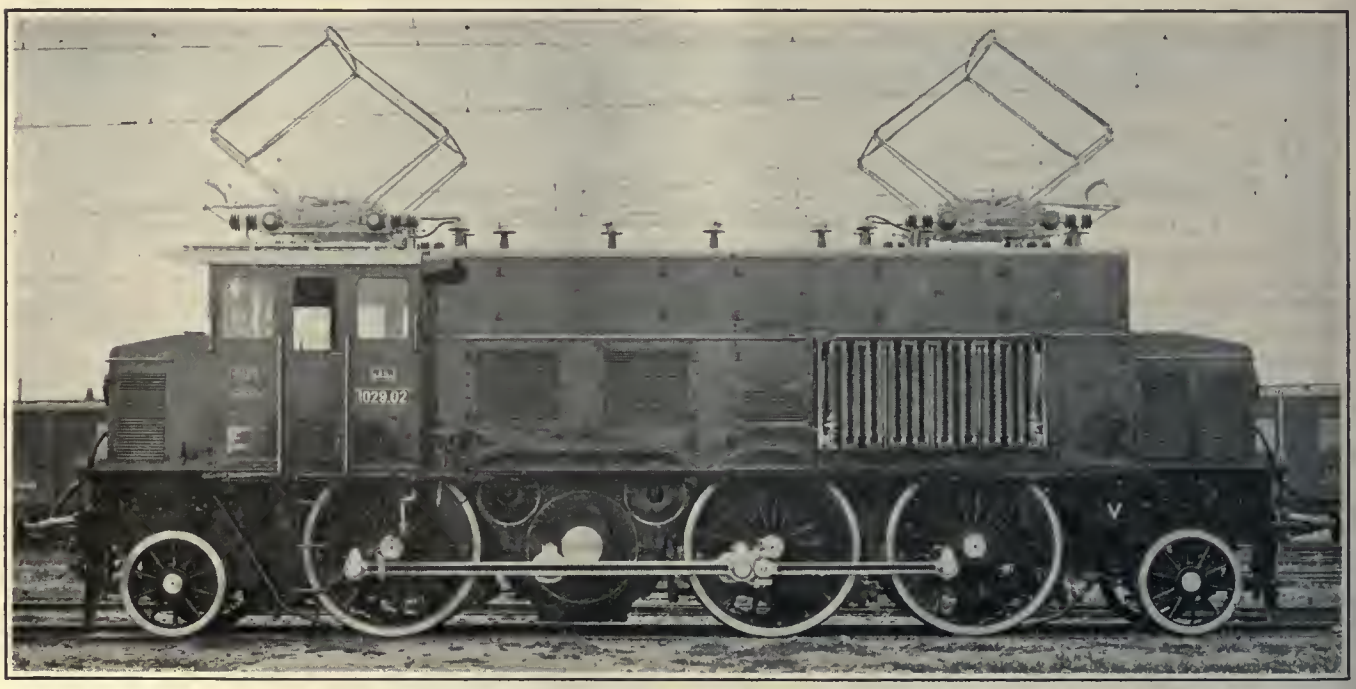
The key for this lock is kept by the station master so that the section of overhead line around a station can be de-energized when necessary only by some authorized person.

The side tracks at all stations are normally dead and must be energized by the engineer of the electric locomotive before he enters them. When the overhead wires at a station are "killed" an automatic interlock closes the semaphore for that section so as to block the entrance of trains into the station.

The supports for the catenary construction are placed at an average distance of 250 ft. apart. Practically all of the poles are of steel, though a few sections of track have wooden or concrete poles. For the entire installation, except in the tunnels, a minimum distance of 10 in. has been established between ground and all parts carrying the trolley voltage of 15,000. This distance has been reduced at certain points in the tunnels to 6 in.

When carried over tangent track the working conductor is zigzagged plus and minus 18 in., so as to distribute wear on the pantograph. The height of the working conductor over the rails in the open averages 20 ft., but in the tunnels this distance is reduced to 16 ft. Whenever a change in the height of the trolley wire is necessary, such as when a tunnel entrance is approached, the change in elevation of the wire is not permitted to exceed one in 300.

Insulation of the entire overhead line construction against ground is double; that is to say, wherever the line is supported there are always two insulators between the wire and ground. Where public highways are crossed and in all switch yards rupture-proof suspension was chosen. Large steel objects on the right-of-way, such as bridges and trestles, are permanently connected by bonds to the rails.



Passenger Train Locomotive on the Arlberg Division

Working Conductor

The trolley wire or working conductor is of figure 8 cross-section. When this section was under consideration, objection was made that such profile is apt to be made soft in the drawing process when made from a round cross-section. This was overcome, however, by rolling the section from rolls made for the purpose. Early in the work a few of the yards were equipped with steel trolley wire instead of copper to save expense, but this plan was abandoned on account of the resulting wear on the locomotive pantographs.

Two methods were followed on different sections of the line for insulating the steel standard catenary cable. On one section of the line use is made for this purpose



No. 1. A Typical Anchor Tower in a Switch Yard on the Arlberg Line. On This Section the Overhead Line Uses Suspension Insulators



No. 2. The Transmission Line of the Arlberg Division Reaches at Times to Higher Altitudes than the Railway

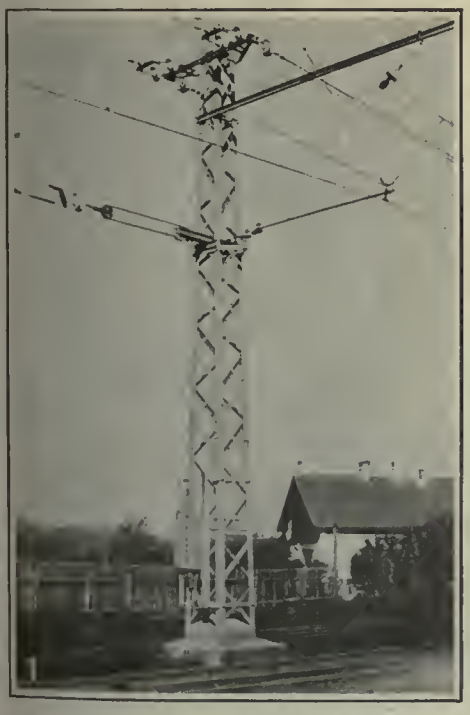


No. 3. The Transmission Towers Are Mounted on High Concrete Bases, at Points Where the Snowfall Is Likely to Be Heavy

of the suspension type of insulators. The catenary itself, on this portion of the line, consists of a standard cable of 49 zinc-coated steel wires, each 1 mm. in diameter, to which the vertical hangers are fastened at intervals of 16½ ft. These hangers are 4 mm. galvanized steel wires, and galvanized steel bolts and brass nuts are used throughout. In long, level portions of the double-track line the poles carry brackets to which are attached the insulators for the catenary cable and also at times an outrigger bracket arm or pull-off for the purpose of steadying the position of the working conductor.

On the second section of line, insulators of the cup and spool type are used. They were tested to withstand 115,000 and 130,000 volts (under oil and air flashover respectively) and each is made from a single piece of porcelain. On these sections the catenary cable is made up of seven galvanized steel wire strands, each 3 mm. in diameter. The hangers are made of 5 mm. steel and instead of supporting the working conductor directly, their lower ends are attached to an auxiliary catenary or carrier cable of 6.5 mm. solid steel, from which the working conductor is supported. All clamps, bolts and nuts are bronze.

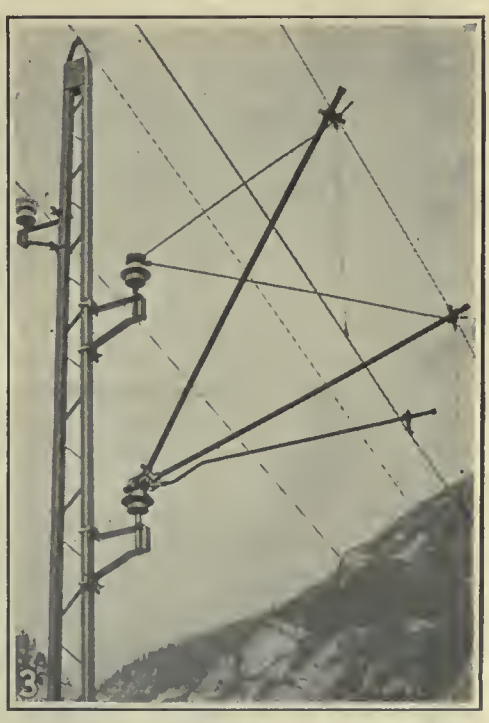
In both of these forms of construction special means are used, except in the tunnels, to maintain a constant



No. 1. A Typical Anchor Tower on the Salzkammergutbahn, Showing Also the System of Counterweight by Which the Trolley Wire Is Kept Taut



No. 2. Type of Construction Used in the Tunnel of the Arlberg Line, Where Precautions Must Be Taken to Guard Against Moisture



No. 3. The Salzkammergutbahn Overhead Construction Is Also of Two Types. The One Shown Elsewhere Illustrates One Type. The Other Is Illustrated Above



Hinged Bracket or Pull-Off as Used in the Section Equipped with Suspension Insulators

tension on the trolley wire. This is accomplished, as in other European installations, by dividing the working conductor into sections and keeping it taut by counterweights. In the 6½-mile tunnel the temperature is so nearly constant that it was not considered necessary to use any method of keeping the wire taut by counterweights.

Overhead Construction in Tunnel and Bonds

While overhead construction in the tunnel was simplified in the respect just mentioned, in other respects it presented many problems, notably because of the limited room and excessive humidity. Some accompanying views show the method followed of supporting the wire in the tunnel.

Over each track were strung two trolley wires, each 65 sq.mm. in section and 16 ft. above the top of the rail. These conductors were supported on special hinged brackets, as illustrated. The catenary cable is of bronze to prevent rusting. The steel used for the fittings is all-coated by the zinc spray method, and while final results have not yet been obtained, it appears that this method has not come fully up to expectations. Suspension points are every 60 to 90 ft. In the middle of the tunnel the lines can be disconnected by oil switches installed in a suitable chamber.

Various types of rail bonds are being tried. At present tests are being conducted with welded bonds. This problem is not yet considered to be solved in a satisfactory manner.

To aid in the maintenance of the line, one gasoline-electric work car is now available and three more have been ordered.

Three Types of Locomotives Used

Three types of electric locomotives are used on the Arlberg line:

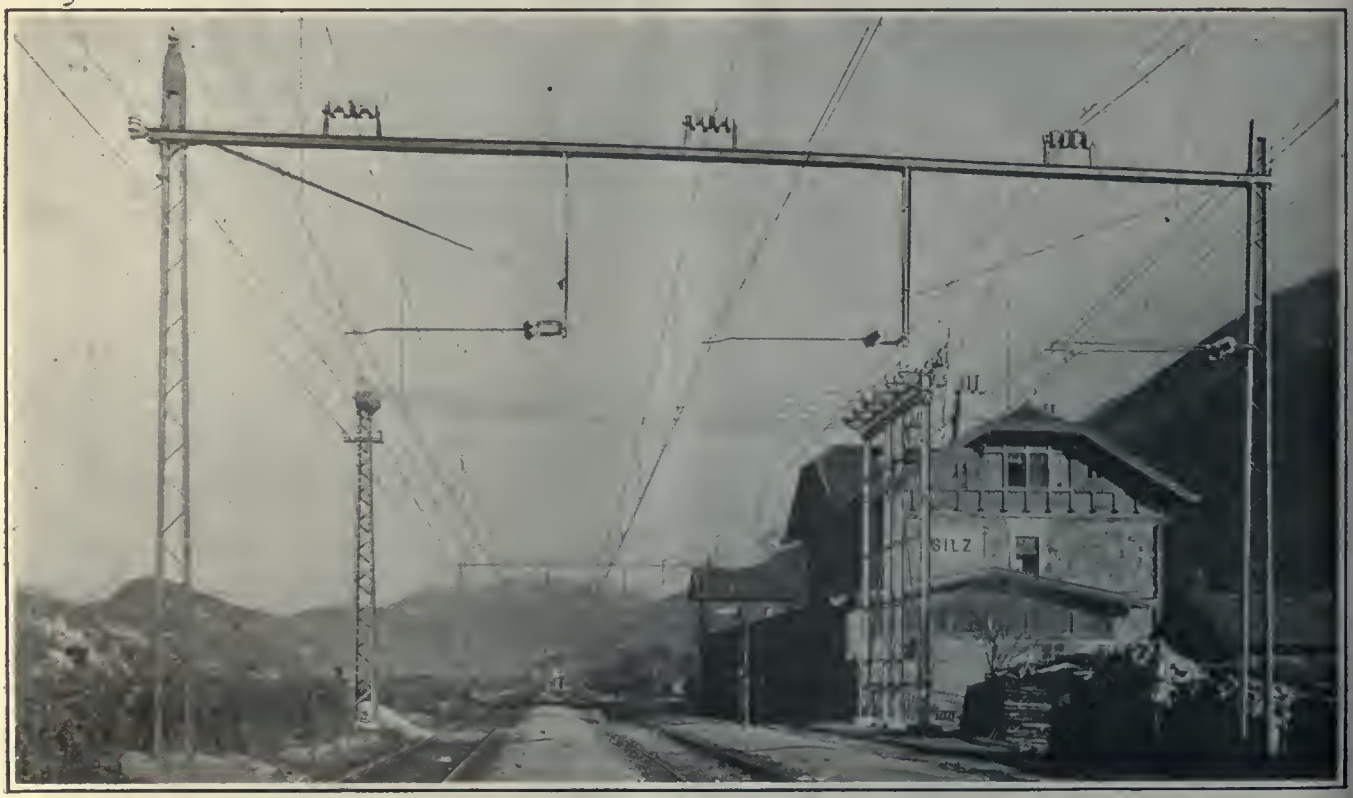
One is the type C locomotive for express trains. These locomotives are guaranteed to haul a train load of 320 tons up a grade of 3.15 per cent at a speed of from 15½ to 19 m.p.h. The electrical equipment of these locomotives was provided by the Austrian Brown-Boveri Works of Vienna.

The locomotives for local passenger trains were built by the A. E. G. Union Company, while the electrical equipment for the heavy freight locomotives was supplied by the Austrian Siemens-Schuckert Works.

Salzkammergut Electrification Finished

The second main road in Austria recently electrified is the Salzkammergut line of 67 miles total length. It also is a heavy-grade railway, with difficult track conditions, severe winter climate and many tunnels. Only one transformer substation is provided to supply the entire route, and this station receives its energy over two totally independent high-voltage lines. A double feeder line runs parallel to the road, except in one section where the catenary cable is of bronze and no feeder was required. The arrangement of sectionalizing the distribution system is very similar to that on the Arlberg road. The overhead construction, however, is much simpler, on account of less severe tunnel conditions.

Single insulation was found adequate throughout this line. The ground cable for protection against lightning is here attached directly to the tops of all steel towers. The line equipment was furnished by three Austrian



This Is a Typical Station on the Section in Which the Cup and Spool Type of Insulator Is Used in the Catenary Construction

firms, the A. E. G., Siemens and Brown-Boveri. All three concerns made very extensive use of swinging outrigger arm construction, which is added to the catenary suspension method, the insulation being at the pole end of the arm, as shown in the left-hand illustration in the lower group on page 961.

This same view shows also the system of wire-tightening device by weights, as installed by the A.E.G. at distances of every six-tenths of a mile. In the tunnels with Siemens equipment a rather heavy double-sided wire suspension is employed.

The feeder through the $\frac{9}{10}$-mile long Sonnstein tunnel and a number of shorter tunnels near by were made as an underground 16,000-volt cable. Without this cable it would have been necessary to carry the feeders over the Sonnstein mountain, which would have required a costly transmission line. This cable was tested with voltages up to 120,000 at 48 cycles without puncturing. Horn gap arresters are at present installed at the points where the overhead feeder enters the underground cable, but past experience has shown that future cables can dispense with this protection.

While only single insulation was provided on the Salzkammergut line, all suspension constructions are so designed as readily to permit the introduction of double insulation, should experience show that the present single insulation is inadequate.

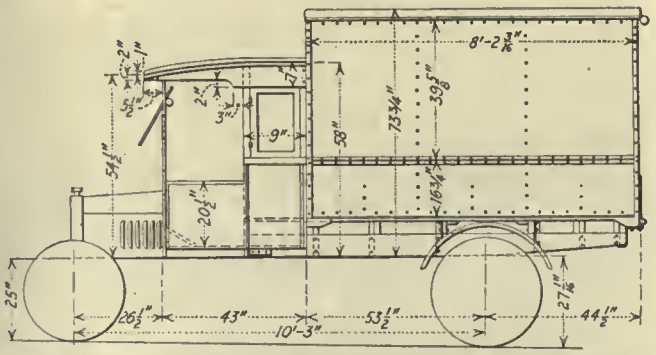
No rail bonds have been installed as yet, but so far no trouble has been experienced by their lack. Every 350 ft. the two rails are crossbonded.

Strong, Light Truck Built for Express Delivery

Illinois Traction System Uses 1-Ton Ford Chassis with Plymetl Sides and Haskelite Roof—Exterior Color Scheme Is Orange and Black

FOR the new collection and delivery express service recently inaugurated by the Illinois Traction System on its main division an unusual type of light truck is used. Bodies designed by J. M. Bosenbury, superintendent of motive power and equipment, are mounted on 1-ton Ford chassis. The framing of the bodies is of white oak, while the roof is of $\frac{1}{4}$-in. three-ply Haskelite and the sides of $\frac{5}{8}$-in. double-faced Plymetl. The roofs of the body and cab are covered with No. 8 cotton duck, held down by copper tacks. Reinforcement of the side is provided by a $\frac{5}{8}$-in. x $1\frac{3}{4}$-in. x $1\frac{3}{4}$-in. tee iron.

The floor of the truck body is of $\frac{7}{8}$-in. oak and has been continued forward into the cab. The driver's seat rests upon this foundation. Thus the space at the right of the seat is available for long material which would otherwise overhang the rear end. This arrangement also permits the driver to unload many of the small packages without walking around to the back of the truck.

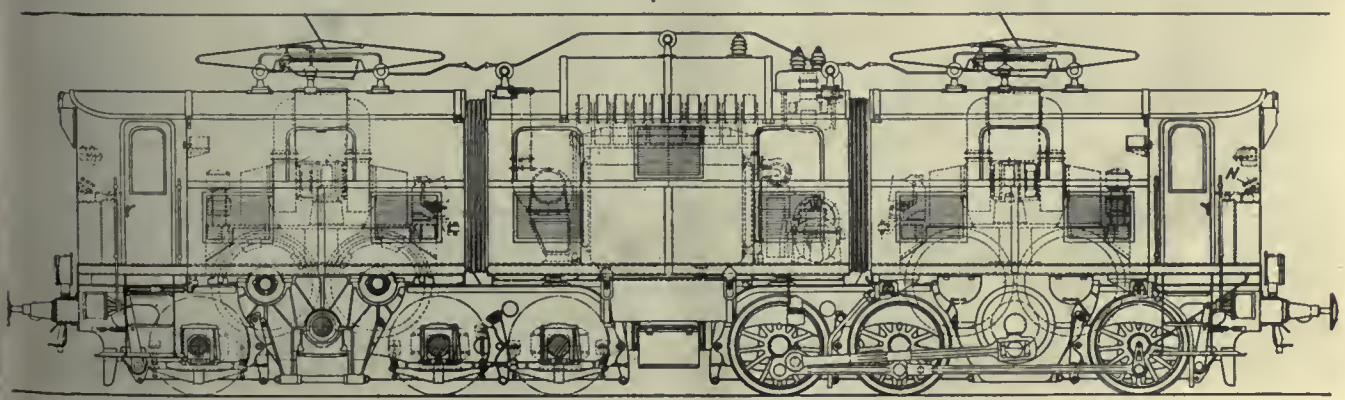


Side Elevation of Strong Light-Weight Express Truck Built by Illinois Traction System

Careful attention has been paid to painting, which is in the company's standard color scheme of orange and black. One coat of primer, three coats of surfacer, two coats of tangerine color, two coats of rubbing varnish and one of outside finishing varnish are used.

Heavy Freight Locomotive for Silesian Mountain Railways

AS PART of the electrification program for the Bavarian section of the Silesian Mountain Railways an order recently was placed with the Allgemeine Electricitäts Gesellschaft for 34 heavy-duty freight locomotives. The frame of the locomotive consists of two three-axle trucks. The driving wheels on these three axles are coupled together with connecting rods and driven from a motor gear shaft located between the outside and second pairs of wheels. Four motors are arranged in two groups in series to form two double motors. These are fed from a transformer, so that the greatest difference of potential across the terminals of the double motor is 840 volts, while the maximum potential to earth does not exceed 420 volts. Control is effected by electrically operated compressed air contactors, which are fixed on the transformer so that a short and simple wiring system made up of flat copper bars is obtained. The transformer is placed at the center of the locomotive on a bridge, the two ends of which rest on the underframe. The bearing points also serve for coupling the two parts of the locomotive frame together.



New Silesian Locomotive Has Two Three-Axle Trucks, Each Driven by a Pair of Motors



Rosedale Car and Bus Loop, Toronto, Showing High-Grade Suburban Background

The locomotive housing is in three portions and the two outer ports are rigidly connected with the underframe. They inclose the double motors as well as the cooling equipment. There is a driving compartment at each end of the locomotive for the control and measuring equipment. The middle portion of the housing is supported by the transformer bridge and incloses the transformers and the contactors. The three portions of the housing are connected together by flexible gangways. Principal dimensions of this locomotive are as follows:

Gage	4 ft. 8½ in.
Driving wheel diameter	49½ in.
Length over buffers	55 ft.
Total wheelbase	38 ft. 9 in.
Fixed wheelbase	14 ft. 10 in.
Total weight	263,000 lb.
Weight per axle	44,000 lb.
Trolley voltage	15,000
Periodicity	16⅔
Maximum speed	34 m.p.h.
Gear ratio	1 to 4.04
Tractive effort for ten seconds	60,000 lb.

MOTOR RATINGS

One hour at 8.7 m.p.h. with tractive effort at wheels of 42,000 lb.	1,090 hp.
One hour at 18.5 m.p.h. with tractive effort at wheels of 43,000 lb.	2,300 hp.
Constant rating at 20½ m.p.h. with tractive effort at wheels of 33,500 lb.	1,960 hp.
Constant rating at 34 m.p.h. with tractive effort at wheels of 20,000 lb.	1,960 hp.

Trolley Loops Made into Parks

ONE feature of the rearrangement of mass transport system in Toronto under the direction of the Transportation Commission was the installation of new loops for turnbacks. Often the residents of a fine neighborhood do not relish the construction of a track loop in their midst, but in Toronto a different viewpoint has come about through the management's determination to make everything connected with the system a matter for civic pride. How this has been done in the case of the Lawton loop on Yonge Street and the Rosedale car and motor bus loop is shown in accompanying illustrations. The loops are in pleasing contrast to the weed-infested lot that often marks such track loops. They are veritable garden spots which a pleased public has delightedly christened "parkettes." A resident in the vicinity of the Rosedale loop fought the installation of a track loop for a long time. When he was finally convinced of the management's esthetic intentions he contributed generously himself a gift of 100 bushes. It was a happy coincidence that the erstwhile objector was a nurseryman. Track loops landscaped in this fashion not only enhance the good looks of the adjacent area, but also provide attractive boarding places for car and bus passengers.



Lawton Loop, Yonge Street, Toronto, with Bench for Patrons

A New Local Transportation Era Is Ahead

Tendencies in Regulation, Franchise Terms, Paving Requirements, Taxation and Rates of Fare Indicate Improved Fundamental Conditions—Rapid Progress Toward Co-ordination of Various Local Transportation Agencies Being Made

By L. R. Nash
Vice-President Operating Division, Stone & Webster, Inc., Boston, Mass.

FROM time to time during the past ten years, particularly the latter half of that period, predictions have been made that the electric railway industry was rapidly approaching the end of its usefulness and would ultimately be replaced, in large measure at least, by railless transportation. Some of these predictions have been based upon the proposal to substitute bus service in New York City for certain existing railway lines. Other similar published views have been based on some abnormal, unfavorable local conditions, politics or prejudice, or have had no tangible basis.

> THE advantages of terminable permits in avoiding recurrent wrangling over franchise renewal conditions, in easier and more stable financing, lower costs of money, and otherwise, are well recognized, and this type of grant undoubtedly will have an important future effect on railway financing, operations and cost of service. All these recent franchise developments tend to remove the railways from the political field and to simplify the provisions necessary for the protection of either company or public.

In spite of contrary impressions, electric railway usefulness is not declining, but is steadily increasing. The traffic now handled is greater than at any other time in the history of the business. Every census of the industry has shown an increase in per capita electric railway riding over that of the preceding period. Between these five-year compilations there have been temporary recessions in traffic as well as in revenue, and this has also been true since the latest census. A year ago the traffic figures were not encouraging, but more recently there has been a noteworthy gain for the industry as a whole. This has not been shared by all companies, the best showings being made by the large city systems and the poorest by the smaller urban and interurban lines.

The phenomenal increase in motor vehicles has obviously diverted a large amount of traffic from rail service of all classes. The total motor vehicle registration in the United States is now close to 20,000,000. For several years automobile experts, as well as others, have predicted the approach of a saturation point in the use of passenger vehicles. However, with present registration equivalent to the number of families which could possibly afford or use an automobile, the manufacture of such vehicles still continues at an unprecedented rate. There are present indications that the "knee" in the curve of per capita registration has been reached and that future production will be limited, to an increasing extent, to replacements, export and the needs of expanding population. The increase in railway traffic in the larger cities is undoubtedly due in large part to the congestion of vehicular traffic, its increasing inability to move readily through or into business streets, and the lack of convenient parking facilities, all of which tend to discourage unnecessary use of private vehicles.

That the industry itself has not lost confidence in its future is shown by the fact that its 1926 budgets show greater provision for upkeep and extension of property than for several preceding years. Furthermore, in spite of abandonments of trackage in favor of bus service or otherwise, there was a substantial net increase in track mileage owned and operated in 1925, as was also the case in the preceding year. Although the evidences of renewed vitality and progress above cited are encouraging, there are other factors which more fundamentally affect the future of local transportation.

Regulation Bringing Transportation Stability

Electric railways are, and for some years have been, subject to regulation in more than three-fourths of our states. There has been no recent substantial change in the character of this regulation affecting rail service. There have, however, been radical increases in the adoption of regulatory methods in the broader field of transportation in which electric railways are now interested. This has included the conferring of rights upon electric railways in many states to carry on supplementary bus service and the regulation of such service whether conducted by railways or independent operators. All but ten states now have regulatory statutes covering the operation of buses. In 1925 ten new acts were passed and fifteen existing acts were amended to give more complete control over bus service. During the 1925 sessions of the state legislatures some 2,400 bills were introduced affecting bus service, 150 of them dealing directly with problems of regulation. Most of the states now lacking general supervision over bus service are located in the South, or in Western sections where low density of population has not invited this type of transportation. Generally speaking, the period of unrestrained and erratic competition between different kinds of trans-

portation, which has continued for more than ten years, has passed, and an orderly development of transportation on economic lines, with due recognition of the rights and duties of existing agencies, may be expected in the future.

The bus regulatory acts commonly include the requirements of a certificate of convenience and necessity, a substantial bond for protection against accidents, regular service over designated routes at stipulated rates, and other minor regulations consistent with those in effect for other classes of public service—all of which contemplate the elimination of uneconomical competition. Adequate supervision of interstate bus business is still lacking. Subsequent to decisions of the United States Supreme Court in 1925, which designated specific limits to state regulation of interstate carriers, the state commissions and others interested in the matter drafted a bill which was introduced in Congress by Senator Cummins, providing for joint regulation of interstate carriers by the commissions of the several states in or through which the service was rendered, with appeal to the Interstate Commerce Commission in case of failure of these commissions to agree. This bill, although indorsed by the National Association of Railroad and Utilities Commissioners and national organizations of motor vehicle operators, was opposed by certain local interests and failed of passage. It will undoubtedly have further attention, and it is of interest to note that a similar bill has been drafted for submission to Congress to regulate in a similar way interstate transactions in electric power, which business is becoming increasingly important. It is generally agreed that centralized federal regulation of utility business, some part of which crosses state boundaries, is not desirable, and that joint regulation by the several states whose boundaries are crossed is both logical and practicable. The crystallization of these views into the necessary federal legislation will be of material advantage to the industry.

Recent Franchises Show Greater Flexibility

In recent years service-at-cost franchises have increased in number and have been improved in some substantial respects. The new railway franchise effective in Cincinnati last year eliminated certain of the undesirable features of its predecessor of the same form, including a removal of the old franchise tax and the cancellation of the city's claim to collect back taxes of this kind which were not earned. This franchise also eliminates paving charges, other than for repairs, and provides for an extension from time to time of the life of the grant under conditions somewhat similar to those in the well-known Cleveland franchise.

The Cleveland franchise has also just been amended in important respects, including an increase in the limits of the barometer fund consistent with the growth of the business, an increase in the range of permissible fares with a 10-cent maximum limit instead of 6 cents previously fixed, and a 1-cent higher fare in suburban areas than prevails in the city. These and other minor changes, together with an extension of the term to 1950, will permit more liberal expansion of the property and improvements in service.

The Grand Rapids service-at-cost franchise, operative since 1922, contains two desirable features: (1) A blanket right to occupy any streets on which service may be needed, without the formalities of supplementary grants, instead of the usual lengthy description of specific and exclusive locations, and (2) a provision that service may be operated by electric cars, trackless trolleys, or otherwise, thus recognizing the rights and obligations of the company to render local transportation service by whatever means are appropriate from time to time.

Increasing attention is being given to the subject of real estate assessments for partial payment of the cost of rapid transit or suburban railway lines. Such added service always brings about a large increase in real estate values which have been enjoyed wholly by the owners of such property. The proposal that a part of this increase in value shall be applied to the development of the transportation facilities which occasion it is receiving logical and increasing support from civic authorities. A detailed plan has been developed in Detroit in connection with rapid transit lines and similar plans are under consideration in New York, Chicago and elsewhere, the outcome of which may be more liberal extension of railway facilities without the prohibitive burdens upon their owners which have formerly existed.

There is still a lack under service-at-cost franchises of an incentive to sustained maximum efficiency of operation. This lack has been pointed out by many writers and in the decisions of regulatory commissions. It is obvious that a fixed wage without hope of advancement or other reward is not conducive to efficiency or progressiveness, and this principle is as applicable to the wages of money in public service as to those of an individual worker. The momentum in public utility alertness and efficiency developed in early years is still in evidence in spite of present regulatory limitations, but it is not logical that it should continue indefinitely.

The terminable form of franchise is receiving increasing attention. It is now effective in only a comparatively few states, and wider use requires supplementary legislation. Such legislation has been urged by the National Association of Railroad and Utilities Commissioners in connection with an indorsement of this form of grant and by many other organizations and prominent individuals. The Illinois Legislature now has a committee investigating this subject, with particular reference to its application to Chicago railway service. The advantages of terminable permits in avoiding recurrent wrangling over franchise renewal conditions, in easier and more stable financing, lower costs of money, and otherwise, are well recognized, and this type of grant undoubtedly will have an important future effect on railway financing, operations and cost of service. All these recent franchise developments tend to remove the railways from the political field and to simplify the provisions necessary for the protection of either company or public.

Railways Gradually Winning Paving Relief

The prospect of continued and increasing relief from the paving charges with which electric railways have illogically been burdened since horse car days is encouraging. Reference has already been made to the omission of such charges from the recent Cincinnati franchise, and other modern drafts show similar omissions. Recent specific cases to the number of more than 60 have come to the writer's attention in which permanent or temporary relief from paving charges has been granted by legislative acts, commission orders or franchise or other city ordinances. Nearly one-half these cases involved franchise modifications. A New Jersey

Senator recently stated, in behalf of a blanket paving relief act, that eight other states had already granted such relief.

The sentiment of regulatory authorities, as well as other students of the economics of the situation, are wholly in favor of the elimination of charges in connection with paving aside from maintenance and other minor costs incident to railway service. This is abundantly shown by an increasing volume of commission decisions and other published statements. An interesting case is that of the New York & Queens County Railway in 1924, in which the commission authorized a specific increase in fare in connection with each paving job forced upon the company, such increase to remain in effect until the cost of the paving had been amortized. Other commissions have authorized removal of tracks to avoid paving assessments, and otherwise expressed disapproval of the practice that imposes upon car riders a burden which not only is entirely foreign to the service they receive but subjects them to added delays in this service. In a recent book the writer referred to paving charges as the "outstanding anachronism of the industry," and such characterization seems wholly justified by the authoritative statements and actions referred to above.

The ultimate satisfactory solution of the paving problem lies in the education of the public regarding the issues involved. When carriding citizens who pass upon franchise provisions, either directly by referendum or through the selection of their administrative officials, clearly understand the injustice involved in their paying for paving which their more prosperous neighbors use for pleasure or business, they will relieve themselves of such payments. The practice adopted by many railway companies of publicly pointing out the effect of paving charges on fares, through newspapers, billboards erected on paving jobs, and otherwise, should be commended as an effective step in this program of education. If the millions of dollars now annually spent on paving work were wholly applied in the future to improved equipment and service or lower fares the public would not be the sole beneficiary, for the railways would share in the gain through increased traffic.

Taxation Relief Must Come

The railway industry has from time to time protested against the heavy burden of taxes and other imposts heretofore carried. The industry does not object to taxes consistent with those assessed upon other property and business, but contends that taxes and imposts amounting to 10 per cent of annual revenues, and in many cases an amount in dollars greater than is distributed to the owners of the properties, are inconsistent with the charges paid by other industries for the support of government. Increasing attention is being paid by tax authorities to a revision of the old system of public utility taxation, including a substitution for all other taxes of a proportion of gross earnings varying between certain limits with net earnings, and early relief is to be expected.

The industry has also pointed out the injustice of federal taxes on its income and that of its employees, whereas corresponding income derived from municipal undertakings of similar character is exempt. The current federal income tax law removes this exemption from municipal employees, but the rest of the program awaits further consideration. Such actions, although only indirectly helpful, indicate a favorable attitude on the part of national authorities in spite of their lack of intimate contact with utility affairs.

> IT IS not unreasonable to look forward to the time when at least the majority of the 60,000 buses now operating in common-carrier urban and interurban service, and for terminal, school and other special traffic, together with a substantial part of the urban taxi business, may be brought into co-ordination with railway systems, with a large gain in load factor and efficiency of operation and a corresponding saving in ultimate total investment. This is believed to be the outstanding present opportunity for transportation development.

The field of co-ordination of various forms of transportation, urban and otherwise, is a most promising one for cultivation by electric railway officials. Only a few years ago the industry looked on the motor bus as a competitive nuisance, but there has since been a revolutionary change in viewpoint. In 1920 only sixteen railways operated bus service as an auxiliary to rail lines. Today nearly 300 companies, or more than one-third of the total number in the United States, are operating buses to the number of about 6,000 over 15,000 miles of route, carrying about 800,000,000 passengers per annum, and involving an investment of upward of $40,000,000. These operations probably include more than 25 per cent of all common-carrier bus service, and the proportion is rapidly increasing through added railway buses, purchase of competing equipment, or abandonment of unprofitable independent service. The ratio of bus service, traffic and investment to total corresponding figures of the industry is small, but there is increasing appreciation of the advantages of buses for scattered traffic, for suburban development service and to avoid expensive track reconstruction even where traffic is comparatively heavy.

The data so far accumulated on the revenues and costs of bus service are still too meager to justify definite conclusions as to the extent to which it may economically replace rail service. It is possible that in a considerable number of cases enthusiasm over the attractiveness of bus service has led to an unwarranted frequency or extent of such service, and that adequate net income has not had sufficient attention. Time and accumulated data will permit the correction of earlier mistakes. The substitution for the time being of railway buses for previous competitive buses without adjustment in their numbers or in the associated rail service also accounts for some instances of unprofitable operation.

Some years ago the writer expressed the opinion that

there was a possibility of further co-ordination between railway and motor-vehicle business in connection with the service now operated by taxicabs. Although these vehicles render exclusive service, there are abundant opportunities for co-ordinating it with rail transportation, including what may be called "pick-up-and-delivery" service, giving passengers convenient transfer between home and railway lines or railway lines and destination, particularly in inclement weather, using railway lines for long intermediate and expensive haul. A through fare system and prearranged taxi connections would add to the convenience of such service. The experiments in this direction which have recently been projected in Philadelphia should be watched with particular care.

Traffic congestion on the streets of our large cities is caused to a material extent by the idle cruising of taxicabs in search of fares. If this cruising could be eliminated by the establishment of a central transportation agency connected with a suitable number of accessible points from which taxis could be summoned speedily, and cruising were correspondingly restricted, the problem of traffic congestion would be much simplified in the interests of both railway service and other necessary users of the streets. It is not unreasonable to look forward to the time when at least the majority of the 60,000 buses now operating in common-carrier urban and interurban service, and for terminal, school and other special traffic, together with a substantial part of the urban taxi business, may be brought into co-ordination with railway systems, with a large gain in load factor and efficiency of operation and a corresponding saving in ultimate total investment. This is believed to be the outstanding present opportunity for transportation development.

Fare Trend Encouraging

The trend of electric railway fares has been distinctly encouraging. The present level is approximately 50 per cent higher than that of 1914, and is as high as at any time since the movement away from the older universal 5-cent fare began. The number of cities in which a 10-cent cash fare is in effect has steadily increased, now totaling more than 80 out of the 288 cities having a population of 25,000 or more—a greater number than is found with any other rate of cash fare. The number of lower cash fares, particularly 6 cents and 8 cents, has correspondingly decreased, and the number of these cities which still retain a 5-cent fare for universal transportation is practically negligible. With the 10-cent cash fare, lower rate tickets are sold where costs warrant, thus combining the desirable simplicity of a single coin fare with concessions to regular riders.

A word of caution may not be inappropriate at this time in relation to bus fares. Many companies inaugurating bus service have made charges therefor identical with rail service, with transfer privileges. Doubtless in many cases this practice is necessary because of the abandonment of earlier rail service over the same routes or the use of buses as substitutes for extensions of rail lines. It is, nevertheless, true that scattered and irregular traffic, which buses largely serve, is unprofitable with either cars or buses, and that rail service is more economical for mass transportation. The intermediate field for profitable operation of buses at rail rates of fare is limited.

Bus service is undoubtedly popular with the traveling public, and if parallel bus and rail service were available, many people would prefer to pay more for the bus service than for the less attractive car ride. This fact is demonstrated by the experience of various companies. If the public prefers bus service and is willing to pay more for it, the companies, particularly in the formative years, should not saddle themselves with unprofitably low rates which cannot later be increased without excessive complications. The experience of railways with the 5-cent fare and the rapid obsolescence of the early types of electric railway equipment should be a warning to the industry not to establish unwise precedents in bus fares under present experimental conditions. The unprofitable character of the bus business in California, where it is most systematically and extensively developed, and the recent spectacular failure of a pretentious interurban bus project in Indiana should be a warning against ill-considered action with respect to rates of fare.

Great Effort Toward Civic Co-operation

Reference should also be made to the active participation of various railway properties in the study and solution of the intricate problems of city traffic regulation. The results so far secured through car and vehicle rerouting indicate further relief, with increased car speeds in business districts and consequent decreased cost of the passenger haul. In other ways, also, railways are taking a more active part in community life and are making special efforts to improve their equipment and increase the attractiveness of their service. This has involved capital expenditures, but substantial operating economies have resulted. It is interesting to note that more than 60 per cent of the new passenger cars purchased in 1925 were equipped for one-man operation, indicating the general satisfaction with one-man service and its payroll economies. The credit standing of properties engaged exclusively in railway business has not as yet shown general improvement, and such improvement cannot be expected in some cases. The industry as a whole, however, may confidently look for a gradual improvement and a return of investment confidence.

Railways Are Not Superannuated

The foregoing discussion has at least suggested that the electric railway industry is not superannuated and obsolete and that the wiping out of its $6,000,000,000 investment is not imminent, as has been claimed recently by a prominent steam railroad official. On the contrary, it appears that the industry is just entering upon a new era of broadened activity and usefulness in which it will have opportunity to demonstrate the soundness of its recently emphasized views that the common-carrier service of the cities is its job, to be carried on with due regard not only to economy in investment and operation but also such liberality and refinement in facilities and service as the public is able and willing to support. Railway executives are every day folks. They have had more than their share of discouragements in past years, but the skill and persistence with which they have attacked and overcome their difficulties gives assurance that they can successfully function in the broader field now open to them. They need one other quality in their new job—vision. The writer believes they have it and can and will develop it further as occasion arises.

Union Station Built at Sacramento

ELECTRIC RAILWAYS entering Sacramento, the capital city of California, have joined hands in the construction of a new union passenger station. This is located at Eleventh and I Streets, in the heart of the hotel and business district. Companies using the station are the Sacramento Northern Railroad, the San Francisco-Sacramento Railroad and the Central California Traction Company. The station is reached by the local street cars of the Sacramento Northern Railroad, which issue to and honor free transfers from the Pacific Gas & Electric Railway street car system.

Architecturally the station is a departure from established precedent in California. It is an adaptation of the Corinthian style, with the front divided into five sections by full length columns, as shown in the accompanying illustration. Materials used are brick and cast stone, finished with colored cement. The foundations are of concrete. The primary supporting frame members are of steel, while the joists and studding are of Oregon pine. Floors are of pine in the offices and of dark red cement in the waiting room, toilets, etc.

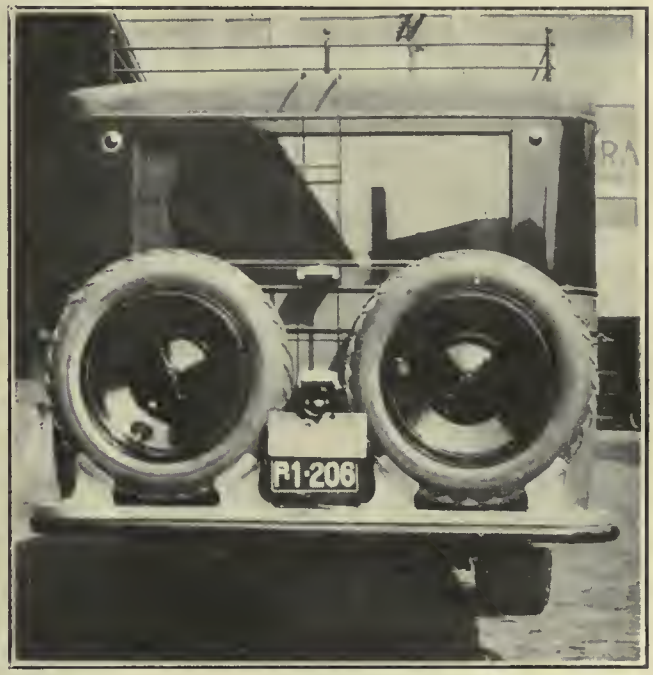
The arrangement is simple and direct, affording convenient access to the trains through the main waiting room. The depot fronts on a new thoroughfare connecting two adjacent streets. At the rear a covered concourse extends the full length of the depot parallel to the tracks. A waiting room 50 ft. x 80 ft. occupies the center of the main floor facing the street on one side and overlooking the concourse on the other side. Walls are of rough tooled plaster decorated in warm tones. Trim is of vertical grain Oregon pine stained gray, while the ticket counter and screen, telephone booths, concession counter, settees, etc., are of quartered oak. The settees are designed with high backs, wide seats and arranged parallel to the direction of circulation.

At one corner of the waiting room is the news-stand. This has a soft drink counter accessible by a sales window to the concourse area fronting the tracks. A privately owned lunchroom is directly connected to the depot by the door adjacent to the news-stand.

On a mezzanine floor are trainmen's rooms at one end and office accommodations for the San Francisco-Sacramento Railroad at the other end. The entire second floor is occupied by the general offices of the Sacramento Northern Railroad. On the ground floor a baggage room is located on one end of the building where it is convenient for receiving baggage from the front on Terminal Street, hand baggage from the waiting room and delivering baggage by truck through a door opening on the concourse to the trains.

Bus Practices Changed at New Bedford

LONGER experience with bus operation has caused the Union Street Railway, New Bedford, Mass., to make certain changes in its standard practices. The color scheme of the buses used by this company has been



Union Street Railway, New Bedford, Mass., Has Found the Rear Bumper to Be the Most Convenient Place to Carry Spare Tires

altered from Pullman green, as used on its cars, to an attractive combination of light and dark brown shades. It has been found that the new color scheme gives a much better appearance to the bus after it has been operating for a considerable period on dusty or muddy roads.

A change has also been made in the method of carry-



Simple and Dignified Union Passenger Station Built by Electric Railways at Sacramento, Cal.

ing spare tires. Buses that have been operated in the past have carried spare tires either in compartments underneath the body or in racks along the sides of the engine hood. These two methods proved unsatisfactory because the compartments were large enough to accommodate only one tire each and were so located that it was practically impossible for the driver to place a tire in them unassisted. When tires were placed on either side of the engine hood it was necessary to cut away parts of the front mudguards to provide sufficient space to hold the tires. Before any engine repair work could be done the mechanics were obliged to move these tires. To overcome these difficulties it was decided to have spare tire racks located on the rear of the bus. An accompanying illustration shows how this has been arranged on one of two Yellow Coaches recently purchased. The tires are supported on aluminum castings resting on the rear bumper. The ladder has been moved from its usual location at the side of the rear to a position midway between the two spare tires.

Pueblo Cars Remodeled for One-Man Operation

Rear-Entrance-and-Exit Cars Have Been Redesigned by the Southern Colorado Power Company for Front-Entrance and Rear-Automatic-Exit Operation

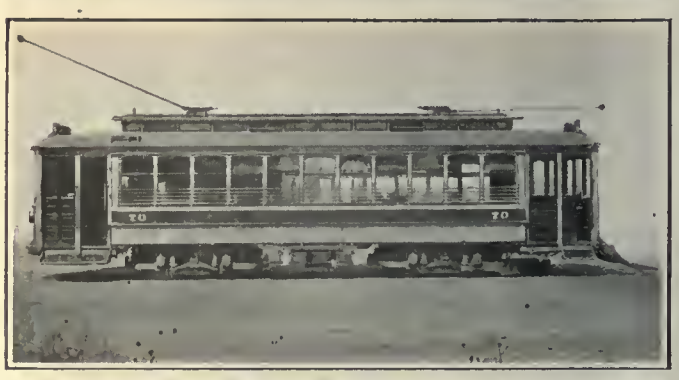
FOLLOWING a change in the city ordinances of Pueblo permitting the operation of one-man cars on all lines, the Southern Colorado Power Company has remodeled much of its electric railway rolling stock. Prior to the early part of the present year the city ordinances had limited the company to the operation of Birney cars on some light traffic lines in the outskirts. Two-man cars were the only type used on the heavy traffic lines.

A serious decrease in riding has occurred during recent years due to the prosperity of the steel business, the principal industry of the city, and the consequent widespread use of private automobiles. In 1920 the railways carried 9,201,474 passengers, while in 1925 the number carried was only 6,947,499, a loss of 24 per cent in five years. Until November, 1919, the fare had been 5 cents. At that time it was increased to 6 cents for a period of three years, and at the expiration of that time it was renewed for a like period. Under the terms of the ordinance it was provided that the fare revert to 5 cents at the end of 1925. On Jan. 27, 1926, however, permission was obtained to increase the fare from 6 cents to 7 cents, with fifteen tokens for $1. At the same time permission was obtained to operate the one-man cars. These two measures have been instrumental in affording relief to the company.

It was decided to remodel the two-man cars on the Lake and Bessemer lines for one-man operation. The Bessemer line, carrying the steel workers, was the heavier traveled line, so it was decided to begin with the Lake line. Cars on this route had been purchased in 1912 and were in good condition with modern motors. They were operated pay-as-you-enter with rear entrance and exit. Remodeling consisted in arranging them for one-man operation, pay-as-you-enter at the front door, with exit through a rear or side door equipped with an automatic treadle. Accompanying illustrations show two types of cars operated by the Southern Colorado Power Company before and after remodeling.









The Two Upper Views Show the Center-Door Car of the Southern Colorado Power Company Before and After Being Remodeled for One-Man Operation. The Rear-Entrance-and-Exit Car (Two Lower Views) Has Been Redesigned for Front Entrance and Rear Exit with Automatic Treadle Door Arrangement

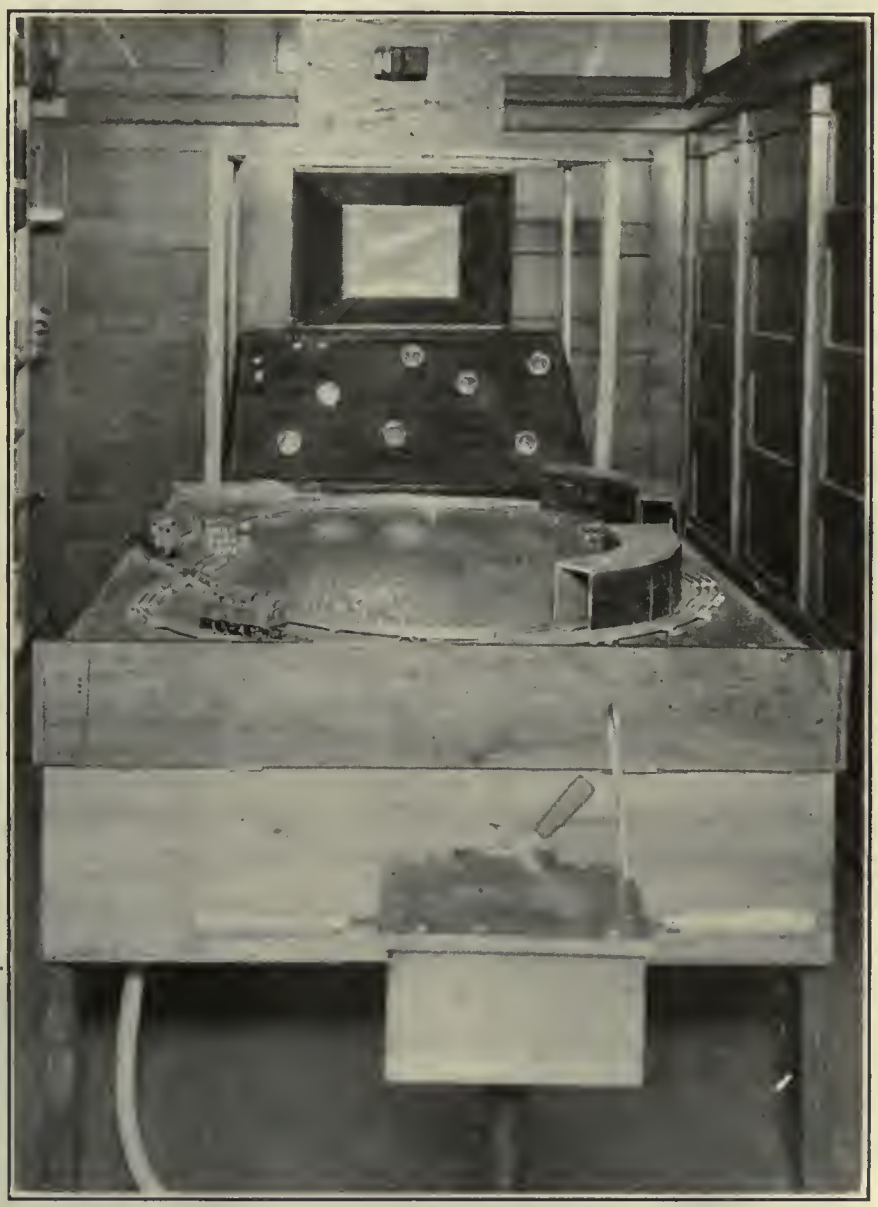
P.R.T. Improves Selection and Training Methods for Employees

Psychological Tests Interposed Into the Process of Selection in Order to Eliminate Candidates Who Are Inherently Unqualified for Platform or Bus Service—All Platform Men Are Trained for Both Motorman and Conductor Duties, so that They Are Interchangeable for Two-Man Operation and Qualified for Duties of the One-Man Car Operators

CHANGING conditions of our civic life have reflected themselves in the greater care exercised by many of the larger companies in the selection and training of car and bus operators. The Philadelphia Rapid Transit Company has been reviewing its methods for a number of months and has announced important changes and additions to its program that are calculated to improve upon the caliber of men through scientific selection and the better training of the successful applicants. Even after men have been trained and are regular operators an elaborate follow-up system will continue to guide them and record their progress.

In a consideration of the Philadelphia methods it is well to realize two fundamental things that differentiate this company's policies from those of many others. First, the company has long since adopted a policy of not re-employing men who have voluntarily left the service. A more recent policy is that all platform men employed must be selected and trained for one-man operation. An applicant breaks in as a motorman and after a month or so receives the additional training necessary in the duties required of conductors. In this way a new man is qualified for operation of either end of a two-man car or a one-man car.

Bus operators are selected in a similar manner to trainmen.



New Psychological Testing Equipment Used in Philadelphia

This view shows the laboratory equipment for the second and third phases of the psychological test used by the Philadelphia Rapid Transit Company. The first phase of this test is the paper test and is given in groups. The last two phases are individual tests which require about a half hour. The applicant stands in front of the small upright table with the several handles in front of him. There are also two pedals, one arranged to be operated by the left foot and the other by the right.

Program of Selection

During an initial interview requiring from five to fifteen minutes by the assistant employment manager the applicant is questioned closely about his past experience, his social and marital condition and a number of references are obtained. This information is noted by the examiner on cards, a different color being used for the different classes of employees, such as train service, bus service, bus mechanical, way and structures, office employees. Whether the applicant is later employed or not, this card remains as a record of his request for work.

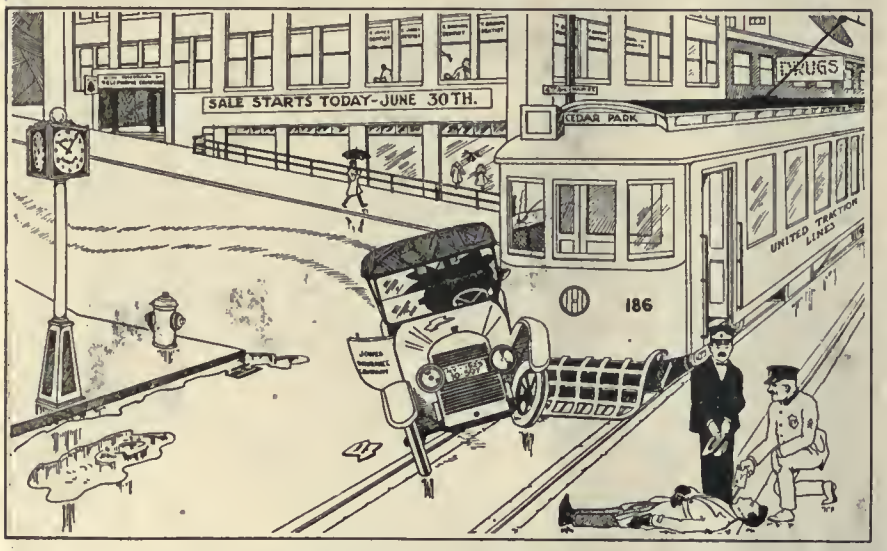
If the applicant passes this preliminary examination he proceeds to the medical department, in the same building, where he is given a quite thorough physical examination, covering eyes for vision and color blindness, ears, major physical defects, hernia and foot trouble.

The applicant then writes his own application and states in his own words the general information re-

quired and gives the references with which he wishes the company to communicate.

Applicants for positions in the train service are being tested at the present time, although no rejections are being made on this basis until standards for rejection have been determined. Such standards are being developed by comparing performance on tests with observed results from work on the cars.

The psychological examination as performed in Philadelphia is in three phases: First, a paper test is given. This test may be administered to a group of applicants equally as well as to one or two. It is a test of the so-called mental alertness type, consisting of a set of thirteen pages and 44 questions. Before the blanks are distributed the applicants are told that they are going to be given this written test and that they will be given a certain limited time to complete it. The object of the examination is to see how much can be accomplished accurately. In other words, if one question puzzles them, they are instructed to drop it and go to the next. The 44 questions cover a series of subjects. On the third page of the test a picture, here reproduced, is shown, and instructions are to look at this for two minutes and paste the top sheet over it with a gum strip provided on the page. Following the picture a problem is given in simple addition. The second question gives instructions pertaining to the association of five names and numbers. Further on other simple arithmetical problems are given, and question seven is the first referring to the content of the picture on page 3. In this way, through the 44 questions, the same subjects are repeated in what psychologists call the spiral order of questioning. Several of these questions and answers are reproduced in these pages to illustrate the plan of this test.



A Memory Picture in the Paper Test

The applicant studies this picture for two minutes and then is asked several questions in the spiral test that follows. This is part of the first phase of the psychological examination for P.R.T. trainmen and bus applicants.

The student now passes to the second phase of the psychological test, which introduces a new element into this class of work. By referring to the illustrations showing the psychological laboratory equipment it will be seen that there are two toy electric tracks. Each of these tracks is in the form of an irregular circle, one interposed on the other, so that there are two intersections, one on either side of the table lying immediately in front of the subject being examined. Also, the tracks are so laid at the rear of the table that there are two points, one on the right-hand side and one on the left-hand side, in which the curves represent non-clearance curves. The toy locomotive on one track is started by the examiner and passes around the track at a predetermined speed. The train on the second track is called the subject's train and is controlled in speed by the applicant, through moving the switch which can be seen in the illustration, located between the two side handles, either to the left or to the right. A small counter is arranged so that the number of revolutions of both trains are counted automatically. The trains revolve about the tracks in the same general direction; that is, counter-clockwise. Tunnels are provided for both the record and the subject's train, so that the movement through these blind areas must be estimated by the student.

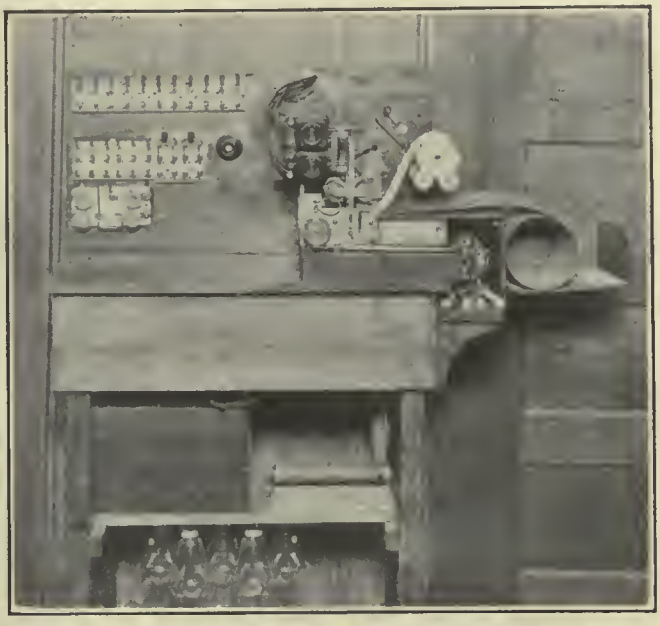
The object of this test is to move the subject's train around its track as rapidly as possible and at the same time to avoid collision at either of the two intersections or the two non-clearance points at the rear of the table. This apparatus is shown to the student and he is told how he may control the speed of the train and is then instructed to proceed. He is given two minutes of this test. Then a second period of two minutes is given under slightly changed procedure. This test was designed to gage the ability of the applicant to judge speed and distance as well as his "recklessness" in operation.

The third phase of the psychological test is then entered. This is a development of the test originally designed for the Milwaukee Electric Railway & Light Company by Dr. Viteles, a description of which process appears on page 624 of the April 10 issue of ELECTRIC RAILWAY JOURNAL. This part of the test, known in Philadelphia as the "signal phase," is operated by the motor-driven mechanism shown in one of the views. The seven lights ahead of the applicant being tested are made to flash on and off in a regular sequence, but at regular intervals a bell is made to ring or a horn is made to sound coincident with one of the flashes. When either the bell or the horn is sounded this signal requires a certain response from the applicant, who stands in front of the upright mechanism seen in the foreground of the picture. Some definite move of the two handles or the two pedals is required for each signal. The applicant is trained in a regular manner and his actions are recorded on the tape for a period of sixteen minutes. During this time the examiner notes the readiness with which the applicant learns to respond to signals. After a moment's rest when the sixteen-minute training period is over the actual test is given, which lasts for six minutes. A record tape is made and the applicant's responses are checked on this tape after the test has been completed. Whenever the applicant makes a response to the bell or horn or disappearing light signal, he sees a small light in the upper left-hand corner of the panel facing him, which shows that he has made the correct response. The instant of this response is also recorded on the tape.

The distraction light, which was used in the Mil-

waukee laboratory, consisting of a 150-watt lamp that flashed on at definite intervals during the test period, has been supplanted in the Philadelphia test by an arc light, which has been arranged to flash violently on and off so that the distraction is partly visual and partly auditory. When this signal occurs the operator must perform a certain combination of movements to make the proper response. This distraction light can be seen through the window at the top of the apparatus facing the subject being tested.

A further variation in this equipment is the flashing on of typical street scenes by means of a small projecting lantern at the back of the equipment. Pictures become illuminated at certain definite periods of the test on the small screen seen directly in front of the applicant being tested. This portion of the test was developed for the psychological test now given to taxicab drivers in Philadelphia under Dr. Viteles' direction. This is of particular value for use in selecting applicants for bus drivers as well as taxicab operators. This use of street scenes is quite new and standard procedure for its use has not been developed.



The Operating and Recording Mechanism for the Flashing Lights Which Give Visible or Audible Signals and Record the Responses that the Applicant Makes

After Selection Comes the Training Period

The psychological tests are estimated to require about one hour. The paper test requires half the time and can be given in groups. The other half hour is an individual test in the laboratory.

Assuming that he has passed all of these tests, the applicant is then sent to the training school.

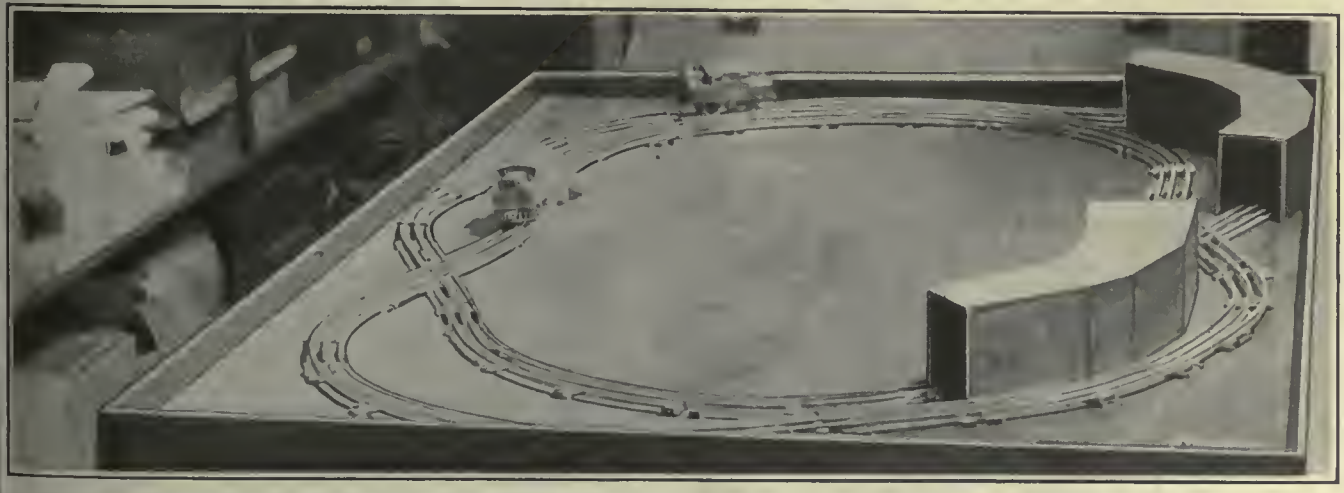
The development of tests ties in very closely with the whole training program, which is in reality an advanced phase of selection, since no man is finally qualified until he has completed training and demonstrated his ability to operate. The entire training procedure is at the present time being subjected to a thoroughgoing analysis and will be fundamentally reorganized. Several important changes in method are still under consideration. Conclusive results from these cannot be anticipated for some time to come.

Following up the student is considered of great importance. On form PT-130, made up on a letter size sheet, the complete employment department's record of each applicant, his training and his follow-up record are entered. The preliminary rating is determined from the first four days that the man spent in the instruction school. The line rating is determined from the ten days that he spent on the cars with the motorman trainer. His final rating is determined from his examination in the school after the fourteen or fifteen days' initial training period. The total rating is based on all of these elements, plus observations of safety and power saving. A place for a record of supplementary training is given on this card and provision is also made for the follow-up record, reports on which are obtained each week on operating, safety and power saving.

On the reverse side of this form is the transportation department's record, showing the operating hours as conductor or motorman. A notation as to power saving and accidents is made and places to record other points, such as absences, misses, violations, reports of courtesy and discourtesy, are provided.

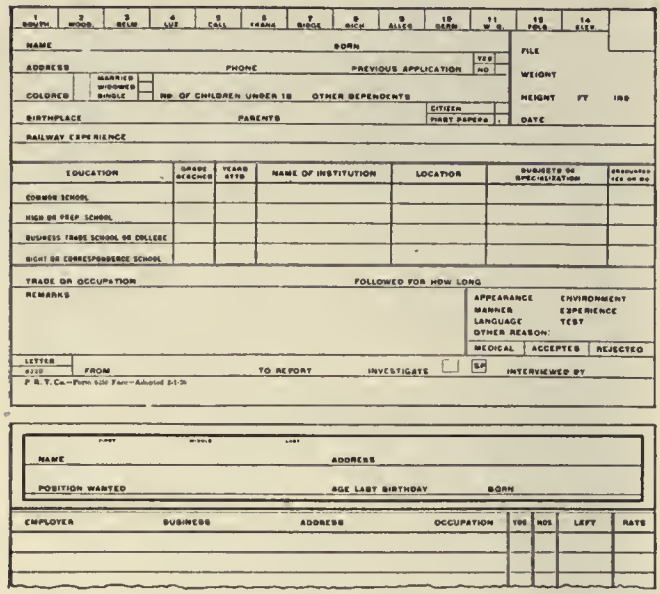
Scientific Background of Psychological Work

It is estimated that several months more will be required before sufficient data are obtained from the new applicants that are being employed every day in order to



A Close-Up of the Train Test Used by the Philadelphia Rapid Transit Company in Selecting Employees

On the table in front of him is the train test, two trains that operate in a counter-trackwise direction, one running at a predetermined speed and the second controlled by the small handle seen on the operator's upright stand. There are two crossings and two non-clearance curves at the rear of the table where collisions may occur. The test is to operate the subject's train around the track the greatest number of times in a two-minute period, with the least number of accidents.



Face and Back of Form Filled Out in the Original Interview for Applicants for Platform Service. Similar Cards of Different Colors Are Used for Other Classes of P.R.T. Applicants

form a proper basis for establishing final standards for selection of applicants, involving the rejection of those found unqualified.

Morris S. Viteles is the consulting psychologist for the Philadelphia Rapid Transit. Dr. Viteles, who is also assistant professor in the department of psychology at the University of Pennsylvania, has had a wide experience in this branch of personnel work, having designed the early equipment used by the Milwaukee Electric Railway & Light Company which was described in the article referred to previously. Included in this story was a historical outline of the development of this class of tests given to applicants in the electric railway industry.

Common to all scientific applications of a genuine nature, a considerable air of modesty surrounds the work and results claimed. The paper test is designed to bring out the simple, although fundamental, qualities of mental activity and persistence that are necessary to the job. The mechanical test in its two phases is designed to measure in a comparative manner the inherent qualities of the applicant's mental and physical makeup; also, his co-ordination is determined in the

Sample Questions from Paper Test of Mental Alertness

Several questions picked at random from the complete list of 44 questions which comprise the first phase of the psychological test recently started by the Philadelphia Rapid Transit Company's employment service. This portion of the test is known as the paper test. Each applicant is given a complete copy of the 44 questions and told that he will be given a limited time in which to answer the questions and that he will be rated on the number he has answered and also the accuracy.

7. Answer the following question about the picture of the automobile accident which you observed:

What was the name of the street the car tracks were on?

Answer: .....

8. Look at these names and numbers:

1	2	3
Oakland	Valley	Downing
4		5
Retreat		Longland

Write alongside of each name below the number which belongs to that name.

Retreat	Valley	Downing .....
Oakland	Retreat	Longland .....
Downing	Longland	Retreat .....
Longland	Oakland	Valley .....

9. Put a Cross Before the Best Answer to this Question:

If you fell asleep on a train and rode 10 miles beyond your station, what would you do?

———Pull the bell rope and stop the train instantly.
———Tell the conductor to take you back.
—×—Get off at the next stop and take another train back to your station.
———Jump off and walk back.

The best answer to this question is "Get off at the next stop and take another train back to your station," so you must place a cross (X) before this answer. Make no mark on the other blank lines.

This is a sample problem to show you how the others like it are to be done.

13. Tokens cost two for 15 cents and exchanges 3 cents apiece. A passenger hands you a dollar bill and asks for four tokens.

What is the smallest number of coins you could give back in change?

———Dollars	———Halves	———Quarters
———Dimes	———Nickels	———Pennies

14. Put a line under the letter "A" below:

A B C D E F G H I J K L M N

You must draw a line under the letter "A" because this is what the directions tell you to do.

15. Draw a circle around the largest number and a line through the smallest number below:

57 19 41 3 101 11 17 99 32

16. Write alongside of each name below the number which belongs to that name:

Valley	Downing .....
Longland	Oakland .....
Retreat	Valley .....
Oakland	Retreat .....

Turn back and look at question 8 if you cannot remember the numbers. Do not guess.

17. Answer the following question about the picture of the automobile accident which you observed:

What is the number of the motorman?

Answer: .....

29. Write alongside of each name below the number which belongs to that name:

Longland	Retreat .....
Valley	Downing .....
Oakland	Valley .....
Longland	Oakland .....

Turn back and look at question 8 if you cannot remember the numbers. Do not guess.

30. If three pencils cost 5 cents, how many pencils can be bought for 50 cents?

Answer: .....

31. Answer the following question about the picture of the accident which you observed?

To whom does the automobile belong?

Answer: .....

32. Write alongside of each name below the number which belongs to that name:

Oakland	Retreat .....
Valley	Downing .....
Oakland	Valley .....
Longland	Oakland .....

Turn back and look at question 8 if you cannot remember the numbers. Do not guess.

33. Put a cross before the best answer to this question:

If you see two automobiles collide on the tracks about a half a square ahead of the car you are operating, what would you do first?

———Bring the street car up to the accident so that you can observe it more closely.
———Pass cards around among the passengers in order to obtain their names as witnesses.
———Bring your car to a stop immediately at a distance from the accident.
———Drive your car up so that you can use it in clearing the track by pushing the wrecked automobile off.

34. Above the first letter below make a cross. Draw a circle around the letter which follows it in the alphabet and a line from this to the last letter below:

J A R N P K L O S T V A

42. Answer the following question about the picture of the automobile accident which you observed:

From what state is the automobile?

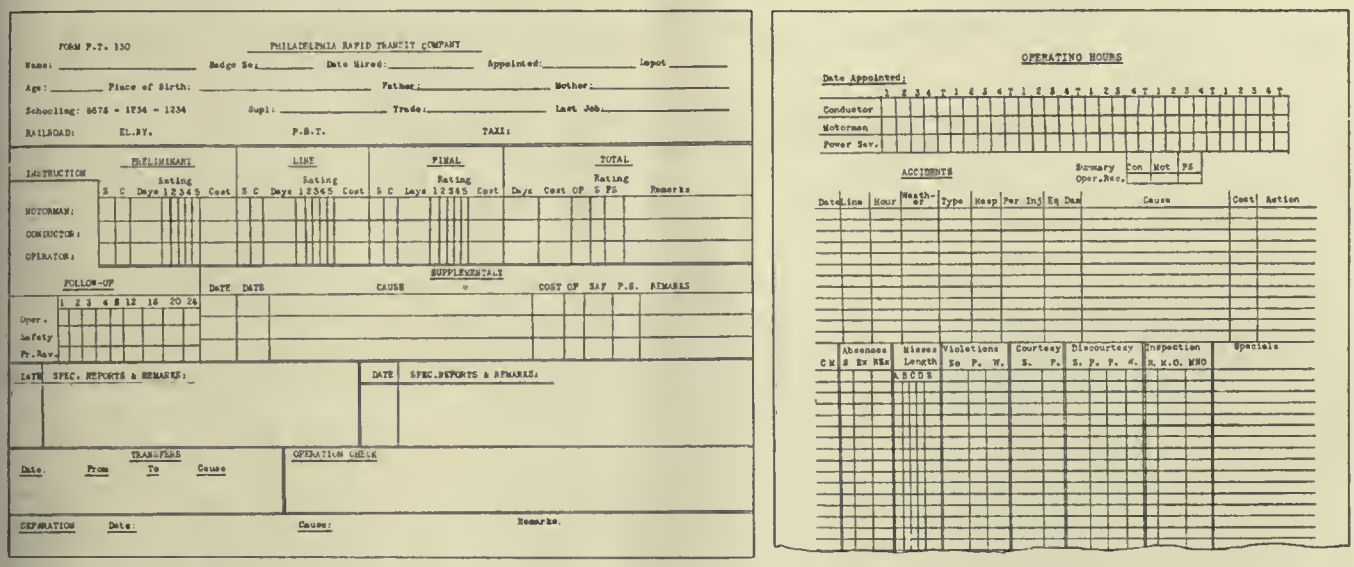
Answer: .....

43. Tokens cost three for 25 cents and exchanges 3 cents apiece. A passenger hands you a $2 bill and asks for nine tokens and nine exchanges. **Note the change in the price of tokens.**

What is the smallest number of coins you could use in making change in this transaction?

———Dollars	———Halves	———Quarters
———Dimes	———Nickels	———Pennies

44. If the letters in the word "so" appear in the same order that they do in the alphabet and if the same is true of the letters in the word "by," write the letter Z. But if this is true of only one of these words, write the last letter of that word. ( )



Face and Reverse Side of Form Used by Philadelphia Rapid Transit Company to Record a Student Operator's Record from the Time He Begins His Training and Continuing the Follow-Up Checks for Many Months After He Has Been "Turned In"

measurement of elapsed time between signals and responses.

All that can be expected through the use of these tests is to avoid the selection of men who do not have the inherent or acquired characteristics necessary. On the other hand, if proper men can be selected the thorough training methods will develop these characteristics to the mutual benefit of the company and the men in the reduction of accidents. The psychologists believe this can be done and are developing the equipment and methods necessary. The problem of comparative measurement or scoring that can be used as a basis for the rejection of applicants is as important as it is serious. Great injustice might easily be done through a misuse of methods or a misapplication of basic principles.

More Passengers with Higher Fare

Weekly Pass Helped to Produce Simpler and More Profitable Fare at Mansfield, Ohio—Through Riders Increased 18 per Cent

By Walter Jackson
Fare and Bus Consultant, Mount Vernon, N. Y.

MANSFIELD, OHIO, is a city of 32,000 inhabitants. Automobile ownership and use have increased greatly in recent years, encouraged by the high class of labor employed by the Ohio Brass Company, the home-appliance plant of the Westinghouse Electric & Manufacturing Company, the Mansfield Sheet & Tin Plate Company and other industries.

Electric railway service of excellent quality with one-man cars is supplied by the Mansfield city lines of the Ohio Public Service Company. The equipment is well maintained and intelligently supplied in accordance with the needs of the community.

Nevertheless, patronage had been going downhill since 1920. This may have been due in some measure to increase of fares, but undoubtedly the chief cause was the multiplication of automobiles. One proof of the latter is that although an 8-cent cash fare and a 7½-cent token rate (seven for 50 cents) had been established as early as Feb. 18, 1921, the initial decline was accelerated in following years right up to April 19, 1925, when the City Council approved a new scale as follows:

A cash fare of 10 cents to replace the multi-coin cash fare of 8 cents.

A token fare of 8 cents (five for 40 cents) to replace the 7½-cent token.

A weekly pass at $1 to yield a low rate to persons using the service for more than twelve rush-hour rides a week.

Why the Pass Scale Pleased the Public

In the ordinary unit-fare way of securing more revenue through higher rates, every class of rider is unpleasantly affected. Hence there is more community opposition with the frequent result, in walking-distance towns, that the higher fare proves disappointing to the railway in revenue and injurious to the community's business and social activities in reduction of riding.

A different principle was tried at Mansfield. The cash fare of 10 cents, it was pointed out, need be paid only by casual visitors or those automobilists whose cars were in the repair shop.

On the other hand, the person who would be willing to invest no more than 40 cents for five tokens good any time and for as many as five persons still could ride for 8 cents—the fare hitherto paid by one-half the riders.

Finally, those regular or fairly regular patrons who had been riding for 7½ cents would in the future have the privilege of absolutely unlimited service at a cost of only fourteen 7½-cent rides a week.

From this it is apparent that the increase in cash fare was to be offset by a decrease in the cost of rides taken by regular riders or those to whom they transferred their passes. The semi-regular rider buying 8-cent tokens was hardly touched by the change. That this policy of "divide and conquer" proved a good thing for both the railway and the public will appear from the following paragraphs.

Increase in Both Revenue and Riding Despite Higher Average Fare

In the pre-pass period of 1925, the Mansfield City lines showed the following revenue losses in comparison to the same months one year previous: January, 12

per cent; February, 15 per cent; March, 8.5 per cent; April, 7 per cent.

In the pass-using months, May, 1925, showed the same rate of loss as April, but thereafter to the present period every month has shown gains as follows: June, 15 per cent; July, 20 per cent; August, 16 per cent; September, 14 per cent; October, 13 per cent; November, 29 per cent; December, 21 per cent; January, 12 per cent; February, 22 per cent; March, 19 per cent.

With the old fares, the average rate per through ride ranged between 7.4 and 7.7 cents. Under the new scale, the average fare is about 8 cents. In determining the new average fare it is necessary to reduce the recorded pass rides by 20 per cent to allow for rides that would be figured as free transfers for cash and token passengers.

Although the average fare is higher, the number of through passengers has increased. This is accounted for in large degree by the unusually high proportion of passholders who not only take more rides personally but are also a factor in increasing the car rides by members of their families. An analysis of the February figures will be helpful here:

RIDING AND REVENUE RATIOS, MANSFIELD, OHIO, CITY TROLLEY ROUTES

	Before Passes, February, 1925		With Passes, February, 1926	
Revenue ratios	Total	Per Cent	Total	Per Cent
Cash fares (8 vs. 10 cents)	$5,494	46	$6,925	47
Tokens (7½ vs. 8 cents)	6,512	54	3,081	21
Passes at $1	.....	...	4,560	31
School	.....	...	141	1
Totals	$12,006	100	$14,707	100
Riding ratios	Through Rides	Per Cent	Through Rides	Per Cent
Cash fares	68,672	43	69,259	36
Tokens	91,168	57	38,506	20
Passes	.....	...	79,058	42
School	.....	...	2,840	2
Totals	159,840	100	189,663	100

From the figures given in the table are derived an average sale of 1,140 passes a week and only 17.3 through rides per pass per week. The exceptionally high sale of passes for a city of this population and the relatively small number of through rides go together. Most of the pass purchasers do not have time to use it for a luncheon ride, but they buy the pass because it is cheap and still gives them the opportunity to take extra rides at night and on Sundays.

In this particular month, February, 1926, the average fare was only 7.7 cents compared with 7.5 cents in the pre-pass month of February, 1925. In general, however, the pass schedule averages closer to 8 cents. The increase in revenue was 22.5 per cent, while the increase in through rides was 18 per cent.

Although 18 per cent more through riders were handled, the work of the car operators was decidedly less. Thus there were 587 more cash riders, but a simple dime usually took the place of the cumbersome 8 cents. The number of token riders was cut by 52,662, producing another great reduction in change-making. Transfers were cut 30 per cent or more.

Since most passholders are persons who probably spent $1 a week anyway in purchasing the 7½-cent tokens, the increase in revenue must be sought for in two directions: From casuals paying 10 cents instead of 8 cents and from the companion rides included by passholders.

It is worth noting that a rate of five for 40 cents calls for an amount that is beyond the investment desire of a true casual, thus leading him toward the convenient dime. Again, when 1,140 regular riders cease using tokens, it is obvious that they will often pay a dime fare for a companion in preference to making a rather awkward purchase for something they do not need themselves.

Not the least reason for the success of this fare change was the co-operation of the Ohio Brass Company through its house organ, but unquestionably the most important factor was the appreciation by F. A. Chamberlain, district manager, and Walter Goodenough, superintendent, that the pass plan offered a real opportunity to sell rides and increase good will.

Accidents Reduced in California

THREE companies operating in California have reported a reduction in accidents during 1925 compared with the year previous. They are the Pacific Electric Railway, the Los Angeles Railway and the San Francisco Municipal Railway.

The Pacific Electric Railway, Los Angeles, has indicated a reduction of 1,745 accidents of all classes in 1925, equivalent to 16 per cent less than during the preceding year. Analysis of the different classes of accidents shows that vehicular mishaps decreased 14 per cent, step accidents 49.9 per cent, persons struck by cars 34.6 per cent and derailments 31.1 per cent.

The Los Angeles Railway reports a total number of accidents in 1925 of 20,244, against 23,303 in 1924, although car-miles operated in 1925 exceeded those of 1924. Accidents in which street cars and automobiles were in collision were reduced from 8,946 in 1924 to 7,082 in 1925. During the year 343,000,000 passengers were carried, but only 75 sustained what might be termed serious injuries.

The San Francisco Municipal Railway reported 3,101 accidents in 1925, compared with 3,209 in 1924. The item of collisions between cars of the railway showed a decrease of 23 per cent, only 85 being reported in 1925, while 111 occurred during the previous year.

Safety Has Good Year in Rhode Island

ACCIDENTS involving street cars in Rhode Island operated by the United Electric Railways show a decrease in 1925 over the preceding year, notwithstanding the great increase in automobile registration, which advanced 12 per cent.

The following table shows, by groups, the principal accidents with the percentage decrease in 1925 compared with 1924 and 1924 as compared with 1923. In this connection it is interesting to state that the first four months of 1926 show further reductions:

	Per Cent Reduction 1925 Less than 1924	Per Cent Reduction 1924 Less than 1923
All accidents	8.38	26
Claims reduced	17	20.2
Collisions with autos	9.28	19
Collisions with cars	30.02	44.45
Pedestrians injured	28.07	30.2
Fatal accidents	22.02	40

Organized safety was commenced on this property in 1923, and the year 1924 was the first full year that could be compared with previous conditions. For the year 1923 it was found that a most gratifying reduction had been made in all of the more serious classes of accidents, notwithstanding the fact that automobile registration increased 14.7 per cent.

Maintenance Notes

Used Paint Brushes Kept in Good Condition

THROUGH the use of a well-arranged cabinet for keeping paint brushes while they are in use, the Department of Street Railways, Detroit, Mich., has succeeded in prolonging considerably the life of brushes. Whenever a brush is returned from a paint job, it is placed in the sheet iron cabinet shown in the accompanying illustration. This cabinet is 4 ft. x 3 ft. by approximately 15 in. deep and is provided with five shelves.

Access to the cabinet is obtained through two doors, which are hinged at the center and have clasps for locking at either edge. The shelves or pockets for the brushes are pitched toward the back at an angle of about 20 deg. This slanting shelf has two upright divisions running along the front edge. One is directly at the front edge and is 1 in. high, while the second is back about 2 in. and is 2 in. high. This forms a pocket to catch any paint which may drip down as the brushes are wiped clean from drawing them across the upright partition. In addition to these longitudinal uprights, the shelves are also divided horizontally into different sections, so that all brushes which are used in a particular color can be grouped together. The dividing plates keep the colors from mixing.

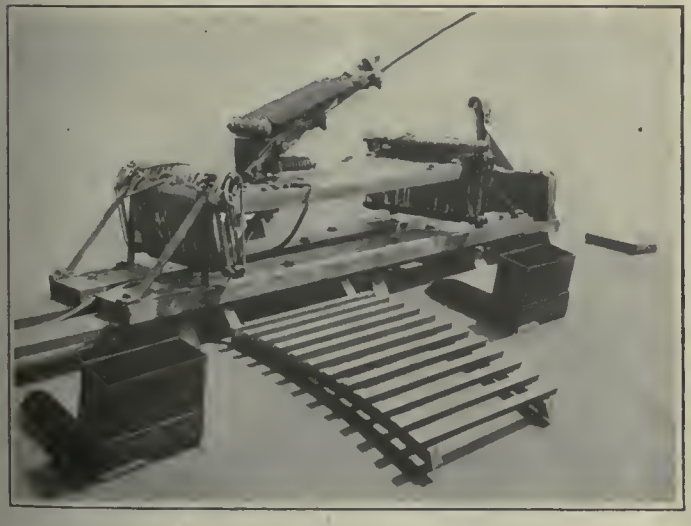


Steel Cabinet Used in the Paint Storage Department of the Department of Street Railways, Detroit, for Keeping Used Paint Brushes

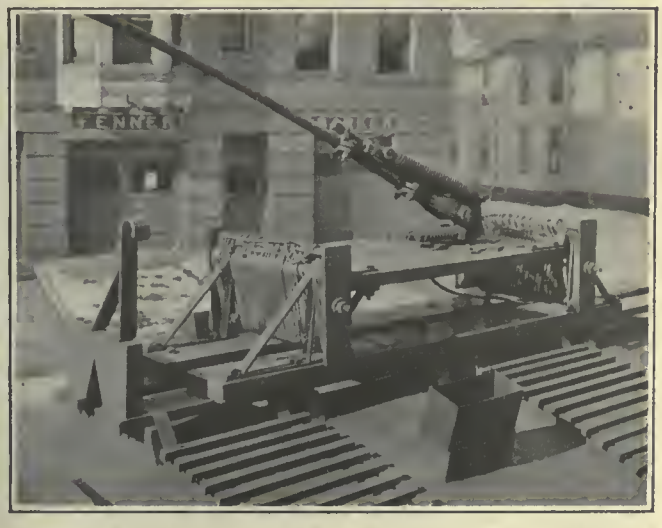
Flexible Trolley Base Suspension Reduces Noise

FOR a means of breaking up the vibration transmitted from the trolley equipment to the car body and also to provide a flexible suspension that will permit the wheel to follow the trolley wire easily, the Buffalo & Erie Railway, Fredonia, N. Y., has equipped one of its interurban cars with the type of trolley base support illustrated. This was originated by Thomas Elliott at the request of the railway officials.

With this suspension, the trolley base is mounted on 2-in. planking, which in turn has a flexible rope support. At the ends of the planking, brackets of ½-in. x 2-in. strap steel are used to hold rods of 1-in. steel tubing. Two similar rods are fastened by steel brackets to the roof boards of the car. At each end of the planking, which supports the trolley base, there are thus three cross-rods; the middle one of the three is fixed to the car roof boards, while the two outside rods are fastened to the trolley base planking. A lacing of impregnated trolley rope binds the rods together and serves as a flexible



Flexible Rope Support Used for Trolley Base on One of the Interurban Cars of the Buffalo & Erie Railway



A Special Fixture Is Used to Hold the Trolley Base Planking in Position During the Lacing Operation

suspension. The rope lacing from the middle rods to the two lower ones serves to support the planking, while the lacing from the middle rods to the two upper ones keeps the planking from rising from its proper position.

The top of the planking on which the trolley base is mounted is about 12 in. above the roof boards of the car. The lower rods are 9¾ in. below the fixed rod and the upper rods 2 in. above the fixed rod. With this method of support, the trolley base is held quite rigid and still a small degree of flexibility is provided. The rope lacing serves to break up any vibrations which would be transmitted from the trolley equipment to the car and so reduces noise in operation.

To provide a support for the planking during installation and also to insure that it is located accurately, a special fixture is used. This is shown in one of the accompanying illustrations. It consists of upright plates, held together by rods. The upright plates are fastened to the roof boards of the car at the bottom, while the central portion supports the trolley base planking. With the boards held in position by this fixture, the rope lacing is applied, and after this is completed, the fixture is removed.

Large-Wheeled Acetylene Welding Truck

EASE of manipulation is particularly desirable in connection with welding equipment. The Grand Rapids Railway, Grand Rapids, Mich., has found that the use of large diameter wheels in connection with a mounting for the tanks and equipment required for acetylene gas welding makes the equipment easy to push. An accompanying illustration shows one of the welding trucks which has solid rubber tired wheels of 36 in. diameter. The framework for supporting the tanks is constructed of 2½x2½x⅜-in. steel angles. A 1¼-in. strap fastens the tanks to the framework. This strap has a hasp and pin connection, so that the tanks can be readily removed and replaced as desired. The truck is provided with wooden handles, which have also been found desirable for use in cold weather, as cold metal is disagreeable to handle. The rubber tires remove jars from the gages and welding attachments so that in operating over rough floors or tracks these do not get out of adjustment.



Large-Wheeled Acetylene Welding Truck as Used in the Shops of the Grand Rapids Railway

Hose Serves as Buffer at Edge of Dipping Tank

DAMAGE to armatures by coming in contact with the edge of the tank while they are being dipped is prevented by a simple method used in the shops of the Erie Railways, Erie, Pa. This is to attach a rubber hose around the edge of the tank. In this case some sections of discarded hose about 2 in. in diameter are used. These are cut lengthwise so as to fit over the edge of the metal tanks. When once in position, the tendency of the rubber hose to close keeps it tightly in position.

New Equipment Available

Asbestos Lumber Dispatching Booths

BOOTHS of asbestos for use in telephone train dispatching on electric railway lines are now being manufactured by the Asbestos Buildings Company, Philadelphia, Pa. These booths are made from Ambler asbestos lumber, which is manufactured from long fiber Canadian asbestos and Portland cement, built up in sheets and consolidated under tremendous hydraulic pressure. The asbestos lumber has set-in patent galvanized brass pin hinges, bolted on, and a galvanized safety hinge clasp is provided for the padlock. The floor is of tongue and groove pine. The booths are shipped in knockdown form and can be erected by ordinary labor, without the need of the erection crew and engine which are necessary when concrete booths are constructed along the right-of-way. The asbestos lumber from which the booths are made is fireproof and cannot rot or deteriorate from exposure to the weather. No paint is required and there is nothing to need repairs, as asbestos lumber becomes harder and stronger with age.



Telephone Booth of Asbestos Lumber with Galvanized Fittings

Push-Button Motor Control Developed

BUILT for across-the-line starting of slow speed motors and for reduced voltage starting of higher speed motors, a completely self-contained oil-immersed automatic starter for 2,300-volt synchronous motors has been developed by the Electric Controller & Manufacturing Company, Cleveland, Ohio. To start a motor, the operator pushes a button, and as the motor approaches synchronous speed the field excitation is automatically applied.

The reduced voltage starter consists of an automatic double-throw switching mechanism, a power transformer, potential transformer and the current limit transition relay, all contained in a tank of welded boiler plate. On the outside of the tank there is a dust-proof steel cabinet, which incloses the field switching mechanism, field discharge resistor, timing relay and d.c. field ammeter.



Self-Contained Oil-Immersed Automatic Starter for Synchronous Motors

This cabinet may also contain an automatic starter for operating a magnetic clutch. The full voltage starter is of similar construction except that the starting auto transformers are omitted. This equipment is complete in a single unit.

Safety Zone Markers

OF A TYPE particularly suitable for street car safety zone markings as well as other forms of traffic regulations, Graf-Barton traffic signals have been placed in service in a number of cities throughout the United States. Several types of these signals are available, the two pictured in the accompanying illustration being especially recommended by the makers for safety zone application.

The signals consist of corrugated or smooth traffic buttons in which sensitive reflecting lenses have been placed, making them plainly visible at all times. As a point in their favor the manufacturers state that the signals are not electric and, therefore, are not subject to the ills of electric systems generally. Each signal is cast in one piece from alloy metal of considerable strength and is mushroom in shape, thus giving the least obstruction to traffic. The various types of Graf-Barton signals are uniform in their general dimensions, being 5 in. high and with a diameter of 15 in. The standard weight is 40 lb. per signal, and approximately fifteen minutes each for installation is required. Four 3 to 4-in. pins are inserted in the paving, while one hole in the top of the signal dome is provided for an anchor bolt for installation purposes.

The city of San Francisco, Cal., has recently purchased 500 of the corrugated types of signals and Los Angeles, Cal., is at present using a like number. Smooth type signals are in use in Birmingham, Ala., and Memphis, Tenn., and in some cases the slow signals have been utilized for street car safety zone purposes as well. Smaller numbers of signals have been installed in other cities and sample orders are being demonstrated in various sections of the country.

At night the reflecting lenses give a brilliant automatic signal. The lens used has been developed after more than a year of research and experimental work in co-operation with various lens factories both in this country and abroad. The reflecting is accomplished by means of a special process of molding the glass, so there is no gilt or mirror backing to peel off or to deteriorate from dampness and other weather conditions.

Welded Steel Tank for Transformer



A Transformer of Oil-Tight Construction Is Inclosed in a Sheet Metal Tank

HEAVY end frame construction and a welded sheet metal tank are outstanding features of a new shovel type transformer just designed by the Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa.

Additional bracing is used to prevent the transformer from sliding around inside the tank. This type of transformer is intended for applications where fine dust finds its way into the ordinary transformer and causes clogging of ventilating ducts. These new transformers are manufactured at present at 2,300 volts, single phase, 60 cycles. but it is also possible to obtain them in other voltages.



Plain and Corrugated Types of Graf-Barton Traffic Signals for Safety Zone Use

Association News & Discussions

Wisconsin's Experience with the Indeterminate Permit*

By Lewis E. Gettle
Chairman Railroad Commission of Wisconsin

THE Legislature, the commission and the courts have universally agreed in Wisconsin that the very essence and foundation of a complete system of centralized regulation is the indeterminate permit complemented by provisions for municipal acquisition and for monopoly of operation. It is recognized that attempts to provide rates that will adequately take care of amortization in the cases of term franchises have universally failed. The public had no assurance of continued, progressive service, and capital necessarily was timid in the face of uncertainties and hostile contingencies. The new form of permit was an effort toward standardization, permanence and a large measure of security whereby the consumer, the investor and the utility would mutually profit.

The outstanding difference between the new grant and the old is that the monopoly feature of the new can be changed at any time by the commission through the issuance of a permit to a competing utility. Revocation is perhaps purely a function of the Legislature or a court, but the commission is vested with almost as effective an equivalent. Competition in the utility field is futile, wasteful, exasperating to municipal authorities in constantly creating conditions of unsightly and unsafe construction, and uneconomic as viewed from any standpoint. "Monopoly" from ancient time was and still is to many people highly offensive. The Supreme Court of Wisconsin has clarified the significance of its application to utility service in terms that divest it of all semblance of malevolence and clothe it with positive beneficence. In Calumet Service Co. vs. Chilton, 148 Wis. 334, the court says:

> We should say, in passing, that the term "monopoly" as thus used is to be taken in the sense of a mere exclusive privilege granted for a consideration equivalent; monopoly only in the sense that the field of activity is reserved to the grantee—the mere element of exclusiveness. A privilege of that sort, where there is a consideration equivalent to the public, though often spoken of as a "monopoly" is essentially different from one of the character regarded as odious at common law and prohibited in many state constitutions. . . .
>
> So while, in common parlance, it is proper to characterize the exclusive privilege in question, a monopoly, it is one purchased by giving an equivalent to the public, as in case of a patent allowed by the federal government. It is a grant for a public, not for a private, purpose, and not a grant of that which without it would be of common right. It has none of the essentials of the monopoly so offensive, anciently, in the eye of the law.
>
> While perhaps the term exclusive privilege is the better term to apply to the right in question, the world "monopoly" has been used in the books with reference to such franchises.

The increasing public demand for utility service is stupendous. In Wisconsin the demand for capital additions to public utilities, exclusive of railroads and other utilities classed as such, has required $50,000,000 annually in recent years. The rural communities are actually clamoring for coveted electric service. The companies are just beginning to study and to meet these rural demands. When a utility must market its bonds at 75 and pay a high rate of interest it must amortize the bond discount and get the money to pay the interest out of consumers during the life of the bond. The form of franchise has a direct bearing on and relation to the economy of financing.

I have been accorded the liberty of

*Abstract of a paper presented before the Missouri Association of Public Utilities, May 3, 4, 5, 1926.

SUMMARY *of Mr. Gettle's Views as Expressed in a Report Prepared by Him as Chairman of a Special Committee on Uniformity of Legislation of the National Association of Railroad and Utilities Commissioners at Phoenix, Ariz., in November, 1924.*

THE fixed-term franchise is the product of a bargain arrived at between the municipality and the public utility promoter, at best with each of these striving for the best bargain available from his own standpoint and each subject to the human limitation of being unable to forecast the future with certainty as to just what changes in the conditions of performing public service will be brought about by the development of the public utility, new improvements, new inventions affecting the service and its cost, the growth in population of the municipality, etc.; at worst such a bargain has, by reason of either the faithlessness or the inefficiency of public officials, resulted in a subordination of the rights of the city and the public to the private interests created by the franchise. At all events a fixing of rights and duties of the utility by such bargaining has proved a hopelessly inadequate method of dealing with a very simple situation.

The franchise in theory has but one purpose and in practice it should be made for that single purpose. It is the grant of a right to use the public streets and highways in the interest and service of the public, and in the last analysis it is only the interest of the public which should be considered in determining its provisions. It is granted not for the purpose of enabling private persons to carry on a private business, but for the purpose of securing adequate public service at reasonable rates of charge therefor. Private interests, whether they be those of the public utility owner, or those of the investor in public utility securities, are created merely as a means to that end.

For the purpose of securing such public utility service as is desired, of course private capital and initiative must be attracted to the enterprise, and to determine whether it would be attracted by allowing the opportunity of earning a liberal return upon the investment, or whether it be attracted by reducing the risks to a minimum, and decreasing the amount of the return in proportion, the interests of the public must be consulted. And since the state has the power and the means of reducing the risks of the public utility business to a minimum, and in turn attracting into public utility investments capital at a correspondingly cheaper rate, and since the state may thereby reduce the cost of public utility service to the consumer, and extend the opportunities of securing it to a wider portion of the public, the public interests demand that such means and such power be employed.

This is the direct purpose and the direct effect of the indeterminate permit. The interests of the public emphatically do not warrant hanging over the head of the public utility the warning contained in the fixed-term franchise that at the end of the term the municipality, for any or for no reason, may see fit to deprive the public utility of the use of its equipment except as it may be removed from the streets or disposed of at such market as may present itself. Such treatment amounts to an injection by the state into the public utility business of a wholly unnecessary and unjustifiable risk, and can be indulged in only at the expense of discouraging capital investments in public utility enterprises, thereby resulting in necessarily higher rates of charge for public utility service and an impairment of the ability on the part of companies furnishing that service to improve and extend the same as may be required by the demands of public convenience and necessity.

quoting from communications received within a week from banking houses on this subject.

I quote from "Time and Money," by H. V. Bozell of Bonbright & Company, New York, being a statement made Dec. 4, 1925, to the Illinois legislative committee investigating the indeterminate permit:

> There is no doubt that the life of the franchise has a very direct bearing upon not only the cost of financing but also the question as to whether sound financing is possible. . . .
>
> . . . The indeterminate life of a terminable permit, together with the provisions for public acquisition or other guarantee in case of termination, allows long term and consequently cheaper financing—cheaper both in actual price and in the saving due to the absence of necessity of refinancing frequently. It also has a tendency to keep the investment banker "on the job," so to speak, to keep in contact with the company, to be assured that it is constantly giving satisfactory service so that there will be no probability of the termination of its franchise with a consequent weakening of the position of the securities which he has marketed.
>
> . . . That such an argument is not merely hypothetical is graphically portrayed in an instance which came to my attention just two or three years ago. One of the largest, most conservative and most astute investing institutions in America was considering the purchase of a large block of bonds of a company in Oklahoma. The purchase was decided against on account of the franchise situation there. Subsequently, Oklahoma passed her indeterminate franchise law, and on account of that and that alone this large institution decided to purchase the very block of bonds which had previously been decided against.

In the early history of the indeterminate permit private utilities apparently were apprehensive that the public would abuse or use recklessly the new power to buy utilities through easily usable methods and at trifling procedure expense and that such power might be employed to harass companies which did not enjoy pleasing and satisfactory public relations. But the commission early took the position that only where satisfactory service at reasonable rates was utterly impossible or where a utility persistently disobeyed or flouted the orders of the commission would it exercise its power to authorize a competing utility. This position has been maintained consistently even as to cities which desired to do their own lighting for the reason that it was practically shown that the existing utility could perform the service more cheaply and better if the commission's orders were complied with. I recall only one case where a certificate of convenience and necessity was issued to a competing company. This was where a miller incidentally had some surplus water power which he used to furnish current during the summer months to cottagers around a small lake but could not very well increase his power sufficiently to reasonably serve the town for which he had an indeterminate permit. A competing company could give 24-hour service at about one-half of the miller's charges and the company was granted an indeterminate permit.

Under present laws, there is no sale of a franchise by bid or otherwise, and no payment of percentage of gross earnings into the municipal treasury. The franchise has no monetary or property value either for rate-making or purchase purposes, yet it is of such character that the privilege may be defended and protected from invasion or usurpation by every arm of the courts in law or equity. Very occasionally the ghosts of the old provisions arise and assert themselves in rate and purchase cases. The commission, justly we think, allows claims made for franchise purchase costs, but only to the extent that the cash was actually and honestly paid.

Every member of the Railroad Commission since its inception has strongly favored the indeterminate permit form franchise. Halford Erickson, former commissioner, then and now an eminent utility economist, presented a discussion on this subject in 1914, which is an exceedingly valuable early contribution. I quote his concluding observation:

> When everything has been said, however, the fact remains that the indeterminate permit as a form of franchise affords more protection to both the public and the utilities than any of the various kinds of franchises by which it was preceded.

John H. Roemer, former chairman, in his address before the Southern Gas convention at Mobile, Ala., April 3, 1908, vigorously supported the new form of permit but stressed the prerequisite for its successful administration a skilled, judicially minded personnel on the commissions.

Carl D. Jackson, former chairman of the Wisconsin Commission and president of the National Association of Railroad and Utilities Commissioners, in his annual address as such president, at Detroit, Mich., on Nov. 14, 1922, said:

> A limited term franchise is notice that at some future date the municipality or state may see fit to treat the utility property and legitimate investment in public utilities on the junk value basis. Such possibility discourages incentive, improvements, extensions and good service and at the same time increases the cost of all financing.

The Wisconsin Supreme Court has not only established the indeterminate permit in legal security but has added its commendation of the social and economic aspects.

In La Crosse vs. La Crosse G. & E. Co., 145 Wis. 408, the court said:

> The aim of the Wisconsin indeterminate law was to displace existing public utility franchises by new, direct grants from the state of a uniform character free from the peculiarities of old franchises prejudicial to the dominant end in view; the best service practicable at reasonable cost to consumers in all cases and as near a uniform rate for service as varying circumstances and conditions would permit; a condition as nearly ideal probably as could be attained. . . . That such a complicated situation has been met by written law in such a way as to avoid successful attack up to this time on the validity of the law or any part of it, and avoid attack at all, either upon the law or its administration, except in a few instances, and secure optional submission by many owners of old franchises to the displacement of the privileges—is quite a marvel; reflecting credit upon the lawmaking power and the body charged with the onerous duty of administering the statute.

The public utilities of the state seem to be a unit in approval of the law. There is some dissatisfaction and restiveness regarding the valuation methods of the commission, the utilities claiming that the commission undervalues and the public resisting advances in valuations. While the commission's functions and powers have quite often been attacked by bills in the legislature, the tendency has been strongly toward strengthening the utility laws. There has been no retrogression in any essential regard.

The Socialist party, rather dominant in Milwaukee and unwaveringly hostile to all commission regulation, frankly hails any weakness or alleged failure of the law or its administration with satisfaction because it thinks it may hasten universal public ownership—its ultimate goal. Even the Socialists have little or no criticism of the indeterminate permit, but they want the city authorities to administer it.

I cannot summarize my views more clearly than I expressed them in my report as chairman of the special committee on uniformity of legislation of the National Association of Railroad and Utilities Commissioners at Phoenix, Ariz., in November, 1924. I may say most of my colleagues refused to join in my proposed report and the convention refused to approve it because it was thought to be too sharply out of accord with the fixed faith in the term franchise employed in the home states.

COMING MEETINGS OF *Electric Railway and Allied Associations*

June 9-16—American Railway Association, Mechanical Division, annual convention, Atlantic City, N. J. Car matters, June 9-11; locomotive matters, June 14-16.

June 10-11—Advisory Council conference electric railway executives, Eastern region, starting 3 p.m. June 10, Engineering Societies Building, 29 West 39th Street, New York City.

June 21-25—American Society for Testing Materials, annual meeting, Haddon Hall, Atlantic City, N. J.

June 25-26—New York Electric Railway Association, annual meeting, Hotel Champlain, Bluff Point, N. Y.

June 28-July 2—Central Electric Railway Association, summer meeting, S. S. South American, Buffalo, N. Y., to Chicago, Ill.

July 8-10—Midwest Electric Railway Association, annual convention, Brown Palace Hotel, Denver, Colo.

August 12-13—Wisconsin Public Utility Association, Railway Section, La Crosse, Wis.

Oct. 4-8—American Electric Railway Association, annual convention and exhibits, Public Auditorium, Cleveland, Ohio.

Attractive Program Arranged for Bluff Point

BLUFF POINT, on Lake Champlain, N. Y., is such a beautiful spot that it is hard to imagine a convention there without an entertainment program which will suit everybody. Such a program has been arranged for those who expect to attend the 44th annual convention of the New York Electric Railway Association, to be held there on June 25-26.

On account of the fine links at Bluff Point, golf will be the principal form of outdoor sport, and a tournament will be held on Saturday, June 26. There

will also be a ladies' putting contest.

While many will probably drive by automobile to Bluff Point, special Pullman accommodations, consisting of two compartment cars and three 12-section-drawing room cars will be attached to the New York Central train No. 31, leaving New York at 8 p.m. Eastern standard time on the night of June 24. These cars will be set out on the private siding at Bluff Point, on their arrival there, so it will not be necessary for passengers to leave the train. One of the standard sleeping cars will return to New York Saturday night. The other cars will leave Sunday night. C. H. Beck, Westinghouse Traction Brake Company, 150 Broadway, New York, has charge of the Pullman and transportation arrangements.

Engineers Debate Parking Restriction

Better Use of Existing Streets Rather than Creation of New Ones Is Proposed to Relieve Traffic Congestion—Common-Carrier Vehicles Can Be Used Advantageously to Replace Private Automobiles

INCREASING the efficiency of passenger transportation in city streets by making the entire roadway available for moving vehicles was the subject of lively discussion at a meeting of the American Society of Civil Engineers held at New York June 2. Representatives of the electric railways, the Regional Plan of New York and Its Environs, the police department and various other agencies contributed their views. Better use of existing streets rather than construction of new streets was held to be the most practical method of relieving traffic congestion.

A paper dealing with parking regulation and its effect on city transportation was presented by John A. Miller, Jr., associate editor ELECTRIC RAILWAY JOURNAL. Use of the public streets for the storage of private automobiles is tolerated, he said, only because of an exaggerated idea of their importance in the general transportation plan. Traffic counts in several large cities show that public transportation vehicles are carrying upward of 75 per cent of the total traffic, although they constitute only about 15 per cent of the total number of vehicles. Retail trade suffers greater loss now on account of traffic congestion than would be occasioned by the elimination of parking.

Most wasteful of all vehicles used in passenger transportation is the taxicab. Investigations made at various locations in New York City indicate that the average load is less than one passenger. Approximately half the taxicabs were cruising without passengers. He suggested reduction or elimination of parking and substitution of buses in many instances in place of private automobiles and taxicabs. An abstract of this paper was published in ELECTRIC RAILWAY JOURNAL, May 8.

Discussing this paper, Harold M. Lewis, executive engineer Regional Plan of New York and Its Environs, gave figures showing the relation between speed and the number of vehicles per lane per hour, as determined from traffic surveys made in New York City. Charles Rufus Harte, president American Electric Railway Engineering Association, said that the value of the parking privilege from the viewpoint of the retail merchant depends not so much upon the actual curb length available in front of the store as it does upon the distance from the store to the center of gravity of the entire parking area. In his opinion the time is not yet ripe for any real solution of the parking problem. He believes that the situation will work itself out to a considerable extent. Electric railway traffic in the last year or two has been materially increased because of the difficulties and dangers of driving automobiles in congested districts. Development of electric railway service to such a point of convenience and attractiveness that a still larger number of people will prefer it to the use of private automobiles or taxicabs was mentioned in his talk as one possible way by which relief might be obtained.

As an intermediate step between the present lack of street parking regulation and the type of regulation which might be considered as ideal, W. E. Thompson, vice-president Third Avenue Railway system, suggested the elimination of parking during rush hours only on one side of important streets. He called attention to the results of an investigation made by the Department of Commerce showing that retail merchants all over the country are beginning to realize that congestion is hampering their business. Lieut. William A. Lochman of the Traffic Division of the New York Police Department expressed himself as favorable to a plan to eliminate parking on one side of important streets during rush hours. He admitted that the parking situation is a serious problem and mentioned the difficulty of enforcing the limited time parking regulation, but said that he thought that total elimination of all parking in the congested district was too drastic a step to be taken at this time.

CONGESTION IS CAUSING DECENTRALIZATION

W. G. Strait, vice-president New York Railways, spoke of the work of the Manhattan surface line operators' traffic committee. "We believe that parking ought to be confined to one side of one-way streets and that it ought to be prohibited on thoroughfares south of 65th Street where street cars and permanently established bus lines operate," he said. "The merchants, or some of them, are the principal champions of parking. They are so solicitous of the luxurious comfort of the lady who drives up to their stores in a private sedan that they inadvertently are doing their utmost to make their stores, and, in fact, the entire midtown section, inaccessible to the thousands of her sisters who travel by foot and public conveyance. Their attitude, if continued, will result sooner or later in causing a general decentralization of retail business." An abstract of the report of this committee is published in the news pages of this week's issue of the JOURNAL.

Charles Gordon, editor ELECTRIC RAILWAY JOURNAL, said that the subject of increasing the efficiency of passenger transportation in city streets was a broad community subject and that progress toward the solution of the problem would not be made until all those affected stop seeking their own selfish advantage and consider the problem in the light of what would be best for the community as a whole. He cited the opposition of merchants to parking restrictions and skip-stop car operation as examples of this feeling.

Elimination of traffic bottle-necks was held to be even more important than restriction of parking by Louis Deblois, National Bureau of Casualty and Surety Underwriters. He expressed some doubt about the amount of extra space that would be obtained for moving traffic by forbidding vehicles to stand along the curb for long periods. This was answered by Mr. Miller with figures showing that parked automobiles in some cases take up as much as two-thirds of the effective roadway, and that instances of such use of one-quarter to one-half of the available space were common.

H. H. Dunn, the Beeler Organization, New York City, spoke briefly concerning investigations showing the means of transportation used by Westchester residents in reaching New York City. Other speakers included E. N. Johnston of the American Gas Accumulator Company; Max Miller, contractor, and E. K. Thompson, consulting engineer.

C.E.R.A. Delegates May Return Home by Boat

A ROUND TRIP by water can be made by delegates attending the Central Electric Railway Association convention. Arrangements for the return trip have just been made by the committee in charge. The return voyage will be on the same boat. Just 24 hours layover will be allowed in Chicago and delegates making the return trip will be permitted the use of these accommodations, although no meals will be served while in port at Chicago.

The convention trip will be officially over upon arrival at Chicago, Friday afternoon, July 2. The *S. S. South American* will lie at the dock until 4 4 p.m. Saturday, July 3. For those who have not made reservations the rate will be $85 from Buffalo to Chicago and return, $76 from Cleveland and return and $72 from Detroit and return, including meals and stateroom accommodations. If reservations have been made, the return accommodation can be had for the difference between these rates and the convention one-way rates.

New York Railroad Club Outing

THE New York Railroad Club has changed the date of its midsummer outing from July 15 to July 8. A number of new "stunts" are promised for this meeting by the committee on entertainment.

California Electric Railway Men Hold Semi-Annual Meetings

MEETINGS of the superintendents, engineering, purchasing and stores, accounting, and public relations committees of the California Electric Railway Association were held in San Francisco May 20-22, 1926. The discussions centered on public relations, present-day bus operation, storekeeping methods, and overhead construction. The matter of radio interference by electric railways was discussed at some length, and a committee was appointed to make investigations, conduct tests and report findings and recommendations to the members.

American Association News

Manufacturers' Executive Committee Organized

L. S. STORRS, managing director of the American Electric Railway Association, has just announced the organization of the committee of manufacturers' executives to direct activity leading to the improvement of electric railway cars. Organization of such a committee was decided at a general meeting of car and equipment manufacturers held in New York last fall. This, in turn, was the outgrowth of the meetings of manufacturers arranged during the convention last fall at Atlantic City by Mr. Storrs and by ELECTRIC RAILWAY JOURNAL.

Members appointed on this committee are as follows: M. B. Lambert, Westinghouse Electric & Manufacturing Company; E. P. Waller, General Electric Company; T. W. Casey, National Pneumatic Company; George Frey, J. G. Brill Company, and E. C. Faber of the Barron G. Collier organization. A meeting of the committee is planned for the near future. One of the first subjects to come before it will be action on the report made by the special committee of manufacturers' engineers, which was also appointed at the New York meeting. to undertake a study of car design looking toward reduction in the number of sizes and types of bodies and equipment demanded by the electric railway industry. The work of this committee has been completed and its report turned over to Mr. Storrs pending organization of the manufacturers' executive committee, which has now been appointed.

Equipment

THE final meeting of this year's equipment committee was held at the American Electric Railway Association headquarters, New York City, on June 3 and 4. Those present were: Pierre V. C. See, chairman; Daniel Durie, sponsor; Clarence W. Squier, secretary; Walter S. Adams, W. W. Brown, R. S. Bull, A. L. Broe, A. T. Clark, R. W. Cost, M. R. Hanna, J. M. Hipple, Joseph C. McCune, J. S. McWhirter, E. S. Sawtelle and H. S. Williams.

In connection with Subject No. 1, which included a review of existing standards and specifications, it was decided to include two new designs of air-brake shoes for the American Railway Association's wheel contours in the Manual. In addition to these shoes, necessary standard head, key, brakehead gages and brakeshoe gages are to be included.

Some corrections and changes have been decided upon in connection with standard designs of journal bearings. In making these changes, it was decided to have a single drawing for all journal bearings and to provide a table of dimensions for each bearing. The drawing was submitted and the table of dimensions was approved by the committee.

Recommendations of the Central Electric Railway Master Mechanics Association, relating to dimensions for height of platforms and bumpers for interurban cars, automatic couplers and specifications for end connections were considered. Some of the changes recommended by the C.E.R.A. were thought to require further investigation and the committee decided to continue this subject for another year.

Specifications for gears and pinions were discussed at considerable length and it was decided to include tooth forms for the long and short addendum spur and helical shapes in the specifications. Distinguishing marks for different tooth shapes of spur and helical gears were also decided upon, together with a table giving different rim thicknesses for different pitch gears.

In connection with Subject No. 2, which included air brakes and air-brake rigging, specifications for certain parts under existing miscellaneous methods and practice were decided upon and will be recommended for standard. A new miscellaneous method and practice entitled "Air Brake Equipment—Inspection of Brakes," was also approved.

In considering the subject of car painting, a very complete report was presented by Mr. Bull. This was approved and will be included in the final report.

An inspection schedule for buses was also approved and will be recommended for inclusion in the Manual as a recommended practice. To provide a limit at which gearing should be removed, gages have been developed by Committee No. 5. These gages permit operators to determined easily when the gearing has reached its useful life.

In connection with the boiler code adopted by the American Society of Mechanical Engineers, and which the sub-committee of the equipment committee has been following, it was reported that agreement had been reached to include 16-in. diameter reservoirs in the classification of those with ¼-in. wall.

Specifications for wool waste were presented and approved by the committee and will be submitted as a recommended specification. A report on motor leads and supports was also accepted.

In connection with the study of cars and car equipment with the idea of improving the appearance and convenience to passengers, lighting tests and demonstrations of lighting effects were made by various manufacturers' representatives at the De Kalb Avenue shops of the Brooklyn-Manhattan Rapid Transit Corporation on Thursday night. This study is being made in order that the committee can recommend certain fundamentals that appear desirable to be included in general specifications for cars in regard to lighting equipment.

Space Application Blanks for Convention Sent Out

DIAGRAMS showing the booth layout, together with application for space at the convention to be held at Cleveland, Oct. 4 to 8, inclusive, were sent out June 1 via registered mail by the exhibit committee of the American Electric Railway Association. As in previous years, a 30-day time limit has been set for the return of applications. All space requests received at association headquarters up to the close of business June 30 will be awarded space by the exhibit committee, which is scheduled to meet the early part of July to make the official space assignment. Applications received after June 30 will be assigned space in the order of their receipt by the director of exhibits.

Ample space has been provided for all classes of display. The plans contemplate the full use of both floors of the Cleveland Public Auditorium. In addition, a steel structure, to be known as the Auditorium's West Wing, with an ornamental stucco façade, and planned to conform to the architectural lines of the auditorium, will be erected immediately adjacent to the auditorium. In all, there will be available 111,902 sq.ft. of space in both buildings, distributed over 312 booths. Last year at Atlantic City it was possible to provide only 100,000 sq.ft. of space.

In the auditorium proper there are 156 booths of varying sizes, containing, in all, 43,465 sq.ft. of space. In the Auditorium's West Wing there are 148 booths, covering in all 62,077 sq.ft. In addition there are eight large booths outdoors for operating exhibits of steam shovels, caterpillar cranes, earth borers, tie tampers, welders and other maintenance of way operating exhibits, as well as 1,500 lineal feet of track space for the display of street, rapid transit, interurban, gas-electric, gasoline, crane, dump and other car exhibits. The track space has been divided off into 10-ft. units, in order to accommodate equipment of varying lengths. Should space requests be such as to make it advisable to provide for additional square footage, it will be necessary only to lengthen the Auditorium's West Wing. There is ample city property immediately adjacent which has been placed at the disposal of the association for such use.

The News of the Industry

Mayor Vetoes Richmond Franchise

Mayor Bright of Richmond, Va., vetoed the blanket franchise for the operation of the Virginia Electric & Power Company. The Common Council has been called in special session by President Fred H. Powers to act on the veto, and the general consensus of opinion is that both the Council and the Board of Aldermen will over-ride the Mayor's veto.

The Mayor states in his veto message that he approves the ordinance in every particular save that referring to tax on gross revenue. He declares that the proposed reduction will mean the loss of approximately $70,000 a year in revenue to the city, and suggests that the Virginia Electric & Power Company should be required to pay its proportion of the expenses of increased outlay in the conduct of a growing city. The Mayor says it is manifestly unfair to reduce the tax against the traction company without making a move toward similar reductions in taxes for other corporations.

The existing rate of tax paid by the traction company on its gross revenue is 6¼ per cent. The company argued for a tax of 3 per cent. The 5 per cent tax is a compromise. The proposed tax it to be graduated downward for a period of ten years until it is 3 per cent, at which it is to remain for twenty years, the life of the proposed blanket franchise being 30 years.

Mariemonters Prefer Electric Railway Service

Definite plans for the operation of the Cincinnati, Milford & Blanchester Traction Company by the Cincinnati Street Railway, Cincinnati, Ohio, will be worked out as soon as Edgar Dow Gilman, city railway director, has acted on the request of the railway to purchase the traction line, which operates between Cincinnati and Milford. Meanwhile, at a conference of officials of the railway with residents of Mariemont, the suburb served principally by the Cincinnati, Milford & Blanchester Traction Company, patrons expressed the opinion that they favored electric railway transportation over bus service because the railway was more dependable. Under the plan as outlined by Walter Draper, president, the Cincinnati Street Railway would buy the tracks, poles and wire for $49,000 and would lease the rolling stock and buy the power.

The Cincinnati, Milford & Blanchester line recently was sold by the Kroger interests to a Toledo syndicate headed by L. G. Van Ness, formerly president of the Cincinnati, Lawrenceburg & Aurora Street Railroad, and now in charge of operations of the Cincinnati, Georgetown & Portsmouth Electric Railroad.

In a letter to the director of public utilities Mr. Draper explained that the Cincinnati, Milford & Blanchester traction line had operated years ago to Blanchester, but that portions of the line had been abandoned, until at present it embodies 11 miles of track in all and a carhouse at the terminus in Madisonville at Erie Avenue and the Pennsylvania Railroad crossing. Mr. Draper said the traction line now operated three modern cars on a half-hour schedule and was owned by the Cincinnati Suburban Power Company. If the street railway bought the tracks, poles and wire, the power would be bought from the Suburban company, while the rolling stock would be leased from the Cincinnati, Milford & Blanchester Traction Company.

Mr. Draper expressed the opinion that the road could be made to pay. He said that his company had been urged by residents along the route to take over the operation of the system. The Cincinnati, Milford & Blanchester Traction would link up with the system operated by the railway, which contemplates operating a bus line in connection with the interurban service. All this hinges, however, on the approval of the director of public utilities.

Franchise Draft Presented

Kansas City Document Before City—Sliding Fare Scale Suggested with Extra Return for Economical Operation

WILLIAM G. WOOLFOLK, representing the reorganization interests of the Kansas City Railways, Kansas City, Mo., on May 25 submitted to Judge H. F. McElroy, City Manager, a proposed new 30-year franchise. In the new plan a valuation of the properties of $33,000,000 was assumed as a basis, it being provided that the 7-cent fare be retained for the present.

In the Jost franchise, now in effect, the general provisions for track extensions are thought to be rather too liberal. The new plan provides for track extensions by ordinance of the city "accepted by the company."

Judge McElroy recently warned the officers of the Kansas City Public Service Company, the proposed successor to the Kansas City Railways, that no financial concession may be expected from the city. Hence, the proposed plan retains the provisions in the old franchise in connection with the paving and cleaning between tracks, viaduct rentals and street car licenses.

The plan also provides for the creation of a barometer fund of $600,000. Any excess earnings, over and above the $2,310,000 a year, will be added to the barometer fund. Whenever that surplus fund is more than $900,000 at any quarter, the fare will be reduced to the next lowest step in the scale, on the first of the following month.

The provision for earnings in connection with the ten various fares suggested is so arranged as to stimulate the practice of economy to reach points where lower fares may become effective, inasmuch as the franchise provides for higher earnings on the lower fares. For the period during which the cash fare is 5 cents, the return shall be at the rate of 8½ per cent per annum; when the 6-cent fare is in effect the return shall be 8 per cent; for the 7-cent fare, a return of 7½ per cent and, for the 8-cent fare, a return of 7 per cent per annum.

The new company's return is to be made cumulative after Jan. 1, 1928, under the proposed franchise. After that date, any deficiency in the 7 per cent earnings will be paid from future gross earnings and will draw 7 per cent interest in addition.

Bus Operation Will Be Continued

The bus system, started a few months ago by the receivers of the Kansas City Railways, is to be retained under the new plan, and the present bus franchise is made a part of the proposed franchise. Universal transfers between bus and street car are to be continued.

Replacing the old and intricate system of a city board of control and city representation on the board of directors of the operating company, which was in vogue before the advent of the receivership, the new officials have provided that the city shall receive the same reports as rendered to the president of the company and will have the right to make independent audits.

Interurban provisions of the old franchise are retained, and it is provided that the new company shall spend not less than $2,000,000 during the first three years for rehabilitation of the railway system.

In addition, the city is granted the right to buy the property on a basis of $33,000,000 plus any additions to the property and the capital that shall have been made in the interim. The franchise is made to terminate on Jan. 1, 1956, eliminating the necessity for a popular vote, which is required for all franchises of a duration of 30 years or more.

Judge McElroy announced that he would confer with the members of the

Council, and that he would set a date for an informal hearing to be held on the franchise after that conference. He is said to be anxious to consider seriously any reasonable proposal and to desire settlement of the project at the earliest possible date commensurate with the details involved. Mr. Woolfolk supplied printed copies of the proposed franchise.

Only One Remedy for Traffic Congestion

New York Committee Holds Streets Were Built Primarily to Facilitate Traffic Movement, Not for Parking—Makes Earnest Plea for Recognition of Rights of Majority, Non-Users of Autos

ACCORDING to the preliminary report of the Manhattan surface line operators' traffic committee the traffic problem of the Borough of Manhattan, New York, will not be solved until its primary cause is recognized and a suitable remedy applied. About this problem the committee feels:

> It will not be solved by demolishing hundreds of millions of dollars' worth of masonry from one end of the island to the other in order to construct new thoroughfares.
>
> It will not be solved by chopping down trees and encroaching on our open spaces in order to lay new miles of asphalt.
>
> It will not be solved by bridging over street intersections or by building elevated roadways or by reducing the width of sidewalks or by lopping off ornamental fronts from residences.

The committee points out that Fifth Avenue was widened some dozen years ago and today is more congested than ever. More recently, First Avenue was transformed into a wide, well-paved thoroughfare. Lafayette Street, Park Avenue and Varick Street have all been utilized in the city's quest for additional lanes of vehicular travel. Says the committee:

> Each of these improvements was highly desirable, but collectively they failed of their primary purpose, the relief of traffic congestion, for the simple reason that New York is always confronted with an excess of traffic which may be described as pent-up, awaiting the opportunity to utilize additional roadway space.
>
> No one who has devoted any study to the traffic situation can doubt that within 30 days after the opening of a new longitudinal thoroughfare the congestion would be as great as it is today. If one does doubt it, let him consider traffic conditions on our crosstown streets, of which there are more to the mile than in any other city, and which, in spite of this fact, are even more crowded, at least in the midtown section, than the longitudinal routes.

The committee is of the opinion that the cause of traffic congestion cannot be found in the growth of population. It says that while there has been a considerable gain in the metropolitan area as a whole during the past decade, the recent state census revealed an actual decrease in Manhattan, where the situation is most acute. Nor is business activity primarily responsible. It may be a contributory factor, but the congestion has increased steadily under all manner of business conditions—good, bad and indifferent. Furthermore, congestion in those sections of the city where the pleasure car predominates is noticeably worse than in districts given over largely to trucking. On this subject the committee says:

> The private car riding habit is responsible for nine-tenths of the congestion. The automobile has brought comfort and happiness to many millions of people and prosperity to thousands of others, but it certainly has played hob with city traffic.
>
> Before its advent and, indeed, until every other family owned a car, people living in and near cities traveled in public conveyances between their homes and the "point of interest," which might lie in a business section, the shopping center or the amusement district. Now, however, as many of them as can conveniently find roadway space travel between their homes and the point of interest in private cars.
>
> The number of private cars now seen on downtown and midtown thoroughfares represents only a small proportion of the total number in the metropolitan district. The rest are kept out of the congested sections by lack of roadway space. Whenever a street is widened or a new one opened a few more are able to trickle in, with the net result that they and not the general public are benefited.

The committee wants the public and the public authorities to know that this is what has happened time and again and that it is what will continue to happen until the necessity of restricting or discouraging the influx of private automobiles in congested sections is recognized.

A check of vehicular traffic on one of the principal thoroughfares reveals the fact that the average private automobile and taxicab carries 1.7 persons, exclusive of chauffeur. The roadway space occupied by an automobile is about 72 sq.ft., so each passenger takes up 42 sq.ft. of city street.

The average street car occupies approximately 320 sq.ft. It seats more than 40 passengers and carries more than 80 when filled. Larger cars have a relatively higher seating capacity. The proportionate part of the street space required for each seated passenger is about 8 sq.ft.; when the car is filled each passenger takes up only 4 sq.ft. or less. The amount of roadway space required to transport a person by private automobile is, on the average, seven or eight times as great as is required to transport him by street car. Significant as are these figures they tell only a part of the story, for according to the committee they ignore the fact that the average private automobile in the congested sections occupies roadway space not only when its owner is in transit but when he is in his office or a theater, a store or a restaurant. In conclusion the committee says:

> This brings us to the crux of the traffic situation—the parking evil. On any street where traffic is dense, lines of parked cars can be seen along each curb. The number of travel lanes on these thoroughfares is thus reduced one-third to one-half, depending upon the roadway width of each.
>
> There can be no traffic relief so long as this condition exists. The problem would be solved overnight if we could bring ourselves to tackle it fearlessly and intelligently and with a determination to consider the vital interests of the general public rather than the convenience of a few.
>
> Many if not a majority of these parked cars are owned by residents of other boroughs and the suburbs. When the vehicular tunnel to New Jersey is opened next fall the number of non-resident motorists who add daily to the congestion on Manhattan's streets will be increased materially. Their ranks will be augmented also by fleets of interurban buses, collecting passengers at the curb in the shopping and theatrical districts. Many of these buses are already in operation.
>
> If parking is to be prohibited or restricted on congested thoroughfares, the time to consider suitable measures is at hand. The carrying capacity of our streets is now sorely overtaxed. Relief ought to be afforded before the situation is complicated by a further influx of unregulated traffic.
>
> Parking prohibition, which need not interfere with proper loading or unloading, would automatically release for moving traffic two additional lanes of travel on every thoroughfare to which they were applied and also would discourage the movement into the restricted area of thousands of motor cars that are now parked there unnecessarily. Offsetting any inconvenience which such restrictions might impose on a comparative few is the great gain which unquestionably would accrue to the general public through the speeding up of all forms of traffic.
>
> Unless we are willing to admit that motor car owners constitute a specially privileged class, parking can hardly be considered an inalienable right. Surely, if the city may restrict the height of buildings erected on private property and say what kind of business they shall or shall not be used by, as, fortunately, it may do under the building and zoning laws, it may quite properly prohibit the use of its own streets for the storage of automobiles.

$10,000,000 Skokie Valley Route Opened

Saturday, June 5, one year almost to the day from the date construction was begun, saw service started on the new $10,000,000 Skokie Valley route of the Chicago, North Shore & Milwaukee Railroad. A special train carrying a party of newspaper men and company officials left Chicago Friday morning on a final inspection trip.

Described by President Britton I. Budd as "an event of great importance in the development of the Chicago Metropolitan District," the opening of the new line will place within commuting distance of the Chicago Loop a large area to the west of the Shore Line route of the North Shore Line hitherto inaccessible through lack of transportation facilities.

The Skokie Valley route will also furnish high-speed express service between the Chicago Loop and Libertyville and Mundelein and will reduce the running time of limited trains operating between downtown Milwaukee and Chicago. Express service on the old Shore Line route between Chicago and Highwood and Waukegan will be maintained, but the through Chicago-Milwaukee limiteds will be operated over the new line, connecting at North Chicago Junction with Shore Line trains. Four trains will be run every hour in each direction on the Skokie line.

Completion of the project under the direction of D. H. Howard, engineer of construction, in less than a year is declared by engineering experts to be an outstanding example of speed and efficiency. Work trains have been operating daily over the new line with electric power from the five new automatic substations, furnishing tests to insure maximum operating efficiency in regular train service.

Nine passenger stations of unique Spanish design were built, 48 miles of track laid, 138 miles of wire strung and 469 catenary bridges, comprising 1,200 tons of steel, were installed in the course of the line's construction.

Trains of the Chicago Rapid Transit Company, which, under the terms of a lease, have been operating for more than a year over a completed portion of the Skokie Valley line as far as Niles Center, will continue in service.

Wage Issue in New Jersey

Public Service Railway Gives Views on New Agreement—Wants Old Wages

The wage issue affecting trainmen of the Public Service Railway, Newark, N. J., and its allied properties is up for consideration, with Amalgamated officials planning sessions in the near future on the course to be pursued. The agreement at present in effect between the association, the Public Service Railway, Public Service Railroad and the Public Service Transportation Company expires by limitation on Oct. 1, 1926. In the hope of reaching an amicable arrangement the company, through M. R. Boylan, vice-president in charge of operation, on June 1 made a public statement of its position in the matter.

He first referred to the present agreement, involving an increase in wages, which upon the former operating basis, it was estimated, would cost the Public Service Railway some $2,000,000 a year. It was evident, he said, that the revenue available under the fare in effect at the time would not absorb this additional cost, especially under the conditions of bus competition then existing. Mr. Boylan said this fact was recognized by the State Board of Public Utility Commissioners, which, after careful consideration, suggested that the Public Service Railway put into effect a 5-cent fare good for a ride within the limits of the larger cities, with an additional 5-cent fare for rides in adjacent suburban territory, no transfer to be issued. This rate of fare was substantially that charged by buses.

The utility commission at the same time stated that it would regulate bus competition in accordance with the law and would endeavor to secure the co-operation of the municipalities to the same end. It also declared in favor of a modification of the company's paving obligation. Under these conditions the company accepted the suggestion of the board and put the 5-cent fare into effect, and has since extended it to cover all of its lines. The company realized that only by the greatest economy and efficiency of operation could the revenue received be expected to be sufficient to pay expenses.

According to Mr. Boylan's statement, as far as the company's operations are concerned the result aimed at has been in part, achieved. One-man operation, which offered the maximum rate wage to every operator, was put in effect and efficiency and economy of operation have been to a certain extent attained.

In speaking of the company's losses, Mr. Boylan said that in order to reduce bus competition the Public Service Transportation Company between Oct 1, 1923, and Jan. 1, 1926, raised and expended for buses new capital to the amount of approximately $11,430,000 and will during the present year raise and expend an additional $6,345,000, or a total of $17,775,000. He said every effort had been made to secure the co-operation of public authorities to the end that bus and car service be co-ordinated and the waste inherent in duplicate and useless service be eliminated and it has appealed to the public and to the state Legislature for the removal of unfair and unjust paving charges. While considerable progress has been made in securing the co-operation sought, paving charges still remain a burden upon the company and co-ordination of car and bus service is far from being complete, so that, unfortunately, from every standpoint, the utmost efforts have failed to bring the cost of operating the three companies within the revenue which fares provide. In the 30-month period between Oct. 1, 1923, and April 1, 1926, the three companies together showed a loss for the period of $3,534,217.

It is the opinion of the companies, Mr. Boylan said, that the situation can be corrected by complete co-ordination of street car and bus facilities and relief from paving obligations, combined with a return to the rate of wages in effect prior to Aug. 1, 1923, and still greater co-operation from employees.

Westchester Argument to Take Place on June 11

The appeal of creditors of the Westchester Street Railroad, White Plains, N. Y., to enjoin Leverett S. Miller, the receiver, from discontinuing service on the trolley lines until the property is sold will be argued before the Appellate Division in Brooklyn on June 11. The court annnounced on June 2 that in the meantime the stay would be operative. The announcement was made later that trolley service would be maintained in White Plains, Scarsdale and Tarrytown for the next several days until arrangements are completed for the operation of buses by the County Transportation Company, a subsidiary of the New York, New Haven & Hartford Railroad, which has just obtained franchise rights covering extensive bus routes in Westchester County. Announcement was also made that the Westchester Street Railroad would continue to operate its cars. The reason assigned was lack of substitute transportation facilities.

The sale of the property of the Westchester Street Railroad was ordered in mortgage foreclosure proceedings brought by the Farmers' Loan & Trust Company of Manhattan, as trustee for the holders of bonds amounting to $225.000, which are long overdue. When Justice Morschauser granted an order permitting the receiver to discontinue operations on May 31 the creditors at once applied to the Appellate Division in Brooklyn for a restraining order. They maintained that to stop the operation of cars would damage the property and injure their interests.

The result of recent developments is that bus operation across Westchester County will be established as soon as the necessary consents have been received by the County Transportation Company from municipalities along the Sound shore. It will mean that the New Haven Railroad has a virtual monopoly of intra-county transit facilities in Westchester.

L. S. Miller, receiver of the Westchester Street Railroad, is president of the New York, Westchester & Boston and also of the County Transportation Company, which has obtained the bus franchise.

Louisville Advertises Its Need

The Louisville Railway, Louisville, Ky., recently published in local newspapers six letters, one each day, telling of its needs. This advertisement followed a letter to Mayor A. A. Will, advising him of the intended publicity work. The company is anxious to secure a franchise which will permit it to expand and enlarge its operations, not possible under the present grant with its maximum rate of 7 cents.

During the week the Louisville Real Estate Board adopted resolutions calling for a new ordinance for the railway with no fare limitation. The real estate men are handicapped in suburban development on account of lack of street railway facilities.

Seeks Eight Cents in St. Louis

Receiver Wells of the United Railways, St. Louis, Mo., on June 3 applied to the Missouri Public Service Commission to increase immediately car fares to 8 cents, two tokens for 15 cents, stating that the company under the present 7-cent fare was unable to earn a fair return on valuation. No change was sought in children's fare of 3 cents. Mayor Miller stated that the city would oppose the increase, but that the service-at-cost franchise now being negotiated would be presented to the public in three weeks. Federal Judge Faris authorized the application for an increase, which would net the company about $1,200,000 annually. Hearing on the application was not set.

I.C.C. Schedules Hearings

The hearing assigned by the Interstate Commerce Commission on the application of section 15-a of the interstate commerce act to the Hudson Valley Railway of Glens Falls, N. Y., originally set for June 1, has been postponed until Aug. 3. The hearing on the Grand Rapids, Grand Haven & Muskegon Railway has been set for June 15.

Section 15-a of the transportation act of 1920 excludes from its provisions all railways not engaged in the general transportation of freight. It has been the contention of the American Electric Railway Association that under this provision a great many interurban electric railways which transport freight incidentally but are not operated as part of a general steam railroad system should be included in this exemption and therefore are not bound by the terms of the act. This view has been accepted by the Interstate Commerce Commission, which has agreed to consider the case of different roads individually and decide whether any such road comes under provisions of the act.

Under this ruling two hearings have been conducted. The first, held last December, was that of the Lackawanna & Wyoming Valley Railroad, in which the commission decided that on the records presented the road came under the provisions of the act. But it said, "Future changes in the traffic or operation of the carrier may justify a change in its classification." The other hearing so far held was on May 25 and was of the Interstate Public Service Company of Indianapolis. No decision in this case has been handed down yet

Denver Does Some Boosting

It Isn't a City Without Electric Street Cars—It's a Better City with a Real Good Street Car System

Folks in Denver, Col., are inclined to agree with the caution of this article and to say: "Well, we must have one of the better cities because we have electric cars operated under a system that is incomparable, when its good qualifications are considered."

As he stood at the "Loop" and watched the various cars wind around, a representative of the JOURNAL smiled his approval when he saw on the front dashboard a large sign which read:

BUY A HOME IN DENVER
It's a Great Place to Live.

Why the sign; what the object? Well, the tourist season is beginning. Every day brings hundreds of visitors to the mile-high city and everybody wants a home. Many want a new home, a new place to live, and here is the silent salesman, a homy welcome, an invitation, a declaration that a great place to live is right in Denver. Words like these convince the citizens and the newcomer because they see the declaration flashed every few moments when the electric cars glide by smoothly.

Isn't this the work of some realtors?

No, indeed. It was suggested by W. G. Simmonds, purchasing agent of the tramway, and the directors took to it like a duck does to water. General Manager Robertson said:

> We feel that it is part of our duty to do anything we can to build up our already beautiful city. There has been a wonderful growth in the last few years, both in number and quality; there is much room for more and the way to get it is to go after it, and that is just what we are doing.
>
> We shall carry these signs for an indefinite period; that is, we have placed no limit during the summer season, but we will change the wording of the cards.
>
> There are more than a hundred slogans. We expect to change the cards twice a week, and it may be that we will vary the exhibit, that is, not place them in a numerical row and use them in order, but placard in line with the day's events.

On all the posters the words "It's a Great Place to Live" will be used. President Ernest Stenger said:

> First we are going to educate permanent residents and then we are going to devote our space to the thousands of tourists who will be visitors in the city between June 1 and Sept. 1.

Summing it all up one is forced to conclude that the tramway is doing for the city more than any other method, hence various improvement associations, the realtors, the city fathers are calling in person, via the telephone and by the use of the mails, to say to President Stenger and Vice-President Robertson:

> Oh boy, but you folks have hit upon a wonderful educative idea. Our sincere thanks, appreciation and obligations are yours. As advertisers you may go to the head of the class.

One man upon leaving Mr. Robertson said:

> Never again will I accuse you folks of being nickel nursers.

The V.-P. grinned. Try it in your own city, for be it ever so humble there's no place like home.

Oh, yes, here's one more slogan:

> A good thing to remember and a better thing to do is work with the construction gang and not the wrecking crew.



Emphasizing the Value of Denver as a Place of Residence

Labor Wants Say in St. Louis Franchise

Action of the local Amalgamated union at St. Louis, Mo., in demanding certain concessions in the new United Railways franchise being drafted by city officials was indorsed by the Missouri Federation of Labor at Jefferson City on May 26.

The carmen want official recognition in the franchise of their right to organize, the right of a six-day work week, the right to have differences with the company arbitrated and a provision against the use of one-man cars in congested districts.

While not expressly advocating that members of organized labor should oppose a franchise that does not contain such provisions, the resolution adopted by the state labor convention calls upon labor men to support any fair and reasonable franchise ordinance containing the provisions listed.

International Railway Seeks Loan for Reconstruction

Bernard J. Yungbluth, president of the International Railway, Buffalo, has suggested that the Buffalo City Council loan the railway $750,000 with which to proceed with reconstruction of its Seneca Street line from the city line to Main Street. The railway points out that the city has $5,170,000 in cash on deposit in Buffalo banks and the loan could be made without impairing the city's financial reserve. When the suggestion of the International Railway went before the City Council the city law department ruled that such a loan would be illegal and no formal action was taken. The city law department informed the Council that the company now owed the city $8,000 for paving between the tracks in Main Street some years ago and no effort had ever been made by the company to reimburse the city. The Council ordered the corporation counsel to bring suit against the International to recover the $8,000.

Formal notice has been served on the city by the railway that it is without funds with which to proceed with the rehabilitation of its tracks in several streets which were recently ordered by the Public Service Commission. The railway will appeal to the Appellate Division of the Supreme Court in an effort to have the decision of the state utilities board reversed.

Street Railway Commissioner at Des Moines Attacked

Charges that Mayor Fred Hunter and Councilmen John Jenney and Mrs. C. H. Morris planned in a secret meeting with J. Ben Wiley, secretary of the local street car men's union, to oust Col. Harry E. Wilkins, city street car supervisor, have been made by W. F. Mitchell, commissioner of streets.

In a public statement Mr. Mitchell declared that Mayor Hunter admitted that Mr. Wiley had made charges against Mr. Wilkins. The Mayor later said an investigation would be made.

Mr. Wiley admitted that he had charged Wilkins with being in too strong accord with railway officials, and that Mr. Wilkins, so far as the record shows, had never "gone to bat" with company officials over the rights of the public he is supposed to protect.

Under the terms of the franchise, the city supervisor has equal authority with the company's supervisor in the matter of determining proper service. Mr. Mitchell, who appointed Mr. Wilkins, declared that the fact that the supervisor lives in harmony with car officials is no indication that he is not looking after the rights of the public.

Mr. Mitchell further complicated matters by declaring that if Mr. Wilkins is ousted by the Mayor and Councilmen Jenney and Morris he will be promptly reappointed to the office. Mr. Mitchell said that under the terms of the franchise the nomination of the city car supervisor rests with the head of the Department of Streets.

New Agreement Submitted at Providence

Amalgamated officials submitted a draft of a new wage and working agreement to the officials of the United Electric Railways, Providence, R. I., on May 17 to replace the agreement which is now in effect, though theoretically expiring on May 31. To date no progress has been made as to acceptance of the compact.

The present rate of pay for motormen and conductors is 56 cents for the first three months of their employment, 59 cents for the next nine months and 61 cents after they have been employed one year. The new agreement asks 61, 65 and 70 cents for corresponding periods, an increase of 5, 6 and 9 cents an hour. The present pay of one-man car operators is 6 cents more than is paid motormen and conductors in two-man crews, and the new agreement asks that this be increased to 10 cents. The same differential is asked for motormen and conductors while acting as instructors and for bus drivers. Nine cents increase is requested in all of the mechanical and miscellaneous departments and for car starters, inspectors, money counters, checkers and clerks. In the freight department the agreement asks for 2 cents an hour more for motormen and conductors than is paid in the passenger department and 10 cents an hour more for the crew of the electric engine than is paid to the freight car crews.

The agreement calls for a general increase in all departments of the service, the institution of the 48-hour week, where it can be arranged without impairing the service to the public, and a slight rearrangement of runs so that at least 50 per cent of the scheduled runs shall be eight hours straight, two-thirds of the rest not to exceed eleven hours outside time, the remaining runs not to exceed thirteen hours outside time, and a guarantee of eight hours per day to all regularly employed motormen and conductors.

The relations between the company and the union are not changed, the company being asked to agree that there shall be no discrimination against employees because of their membership in the union and the union agrees that there shall be none on its part against new employees who refuse to join the union. Employees who are now or may later become members of the union, however, must remain members in good standing during the period of the employment.

Seniority rights in promotion in the different departments are asked in all cases when the senior employee of the department is able to qualify for the higher position.

Expiring Franchises at San Francisco Cause Comment

A scheme has been put before the Supervisors of San Francisco, Cal., to meet the emergency that will arise in the near future when the principal franchises of the Market Street Railway expire. Briefly, this plan proposes that the city turn over the municipal lines to the corporation for operation on a partnership basis, instead of wrestling with the difficulties of extending the municipal system over all the existing lines.

The situation is complicated. The franchises do not all expire at one time. In some instances the franchises overlap, so that disconnected portions of the system will expire at widely separated intervals. To take over operation of some routes the city would have to acquire the franchises on those portions where they were unexpired. The company owns the tracks, cars and equipment. To operate the lines the city would have to acquire the tracks and cars or replace tracks and cars with new ones. Naturally this situation has provoked considerable editorial comment. For instance the *Chronicle* said recently:

> The common sense procedure at this time is to get at the facts. We need a transportation commission, whose members are not in politics and not affiliated with Market Street Railway interests, to study the situation and recommend such measures as it can formulate to deal with the case. Then the best method can be selected. Can nothing be done to awaken our public officials to the desperate need for prompt action in creating such a commission?

Wage Increase at Cleveland Accepted

The board of directors of the Cleveland Railway, Cleveland, Ohio, at a meeting on May 27 approved the wage increase to trainmen and all other employees. This is an increase which was ordered on April 27, the day following the City Council's approval of the amendments to the Tayler franchise. The bulletin concerning this increase follows:

> Effective on May 1, 1926, and until further notice, the wage scale for motormen and conductors will be:
>
> | | Cents per Hour |
> |---|---|
> | First three months of service | 65 |
> | Next nine months of service | 68 |
> | Thereafter | 70 |
>
> All working conditions will remain unchanged. These are specifically those stated in notices of May 6 and June 22, 1925.

Part of the train force are members of Division 268 of the Amalgamated Association. After the bulletin on the wage increase was posted members of Division 268 met and considered the effect of the company's announcement, and a committee was appointed by them to discuss it. On May 17 the street railway company issued the following bulletin:

> *To Motormen and Conductors, All Lines:*
>
> In considering with representatives of you who are members of Division 268 the working conditions bulletined you on April 27, we have agreed that the general manager will meet these representatives semi-weekly and the president semi-monthly.

Members of Division 268 voted by ballot at the fourteen operating stations of the company on the question of accepting the increase or attempting to secure amendments to the Tayler grant by referendum. The vote to accept the increase was approximately three to one.

Company officials estimate that the increase will add approximately $700,000 to the annual expenses. They are of the opinion that the present rate of fare will produce an income sufficient to care for the increase, but their ideas probably will be expressed in greater detail after June 6.

$80,000,000 Electric Interurban Under Discussion

Engineers of the Atchison, Topeka & Santa Fé Railroad, it is said, have selected stations along a proposed route for an electric railway line between Bakersfield and Los Angeles at a cost of approximately $80,000,000. Present plans call for the construction within the near future. W. R. White, local agent of the Santa Fé, verified the statement that surveys for the electric interurban line have been made. The line would be approximately 101 miles in length. Rumors have it that joint committees of both the Santa Fé and Southern Pacific companies are considering such a project.

Michigan Elevated May Construct Monorail in Detroit

Following a meeting attended by Mayor John W. Smith of Detroit, G. Ogden Ellis, president of the Street Railway Commission, and H. U. Wallace, general manager of the Detroit Municipal System, it was announced that the Street Railway Commission is agreeable to the proposal that the Michigan Elevated Railway be granted permission to erect a half mile or a mile of its overhead monorail rapid transit system in Detroit at its own expense. It is understood that the granting of this permission will not bind the city in any way with respect to the overhead monorail system, and that the experimental line is to be removed without expense to the city whenever such action is desired by the city.

The recent conference at which the decision was reached grew out of the fact that a letter to the City Council was referred by the Council to the commission. The opinion was expressed that no one should be interfered with in efforts to solve the problem. Action by the Council is awaited.

Another Franchise Drafted in Chicago

Although its present franchise has a number of years to run, a new ordinance for the Chicago Rapid Transit Company, operating elevated lines, was completed on June 1 by Corporation Counsel Busch. It will be submitted to the committee on local transportation of the City Council at an early date.

Like the surface lines ordinance which was recently approved by the committee, the measure is a tentative draft and subject to change. The outstanding feature of the elevated ordinance is that it provides for unification of the elevated and surface lines. There is no law which compels the elevated to submit to such an arrangement.

That the new ordinances will not be acceptable to either the Chicago Surface Lines or the Chicago Rapid Transit Company is regarded as a foregone conclusion by Mr. Busch. Speaking before the Chicago Association of Commerce on June 3, the attorney declared that both ordinances are dependent upon the enactment of state legislation that will permit the municipality to issue terminable permits and to regulate the utilities to which they are issued.

Winnipeg Difficulties Before Board

The Dominion government has appointed a board of conciliation to inquire into the dispute between the Winnipeg Electric Company, Winnipeg, Man., and its street railway employees. The one big union unit had applied for such a board because the company had refused to negotiate an agreement. When the agreement expired on April 30 the company took the stand that it would not negotiate an agreement with any body of men whose affairs were controlled or whose actions were influenced by the one big union, a communistic organization, which had somehow gained control of the committee representing the men following the signing of an agreement with the Amalgamated in 1922.

More details of the quarrel were given in the ELECTRIC RAILWAY JOURNAL, issue of May 22, 1925, page 898.

P.R.T.-Public Service to Run Delaware Bridge Buses

The Philadelphia Rapid Transit Company-Public Service Railway proposal for the operation of buses on the Delaware River Bridge, guaranteeing a minimum annual return to the Bridge Commission of $100,000, will be recommended for approval by the commission at its next meeting.

The two transportation companies of Philadelphia and Camden will operate as the Penn-Jersey Transportation Company. Their offer made on May 28 to the transportation committee of the Joint Bridge Commission carries with it an agreement to pay 40 cents for double-deck buses and 25 cents for single-deck vehicles crossing the span. The bridge is fast being rushed to completion. It probably will be opened within the next few weeks.

Sunday Passes in Des Moines

The Des Moines City Railway, Des Moines, Iowa, has received permission from the City Council to institute a special 25-cent ticket for Sundays only, beginning on June 6. Tickets will be sold on the cars and will be good for an unlimited number of rides. They will be transferable and may be used any number of times by one person up to midnight.

F. C. Chambers, president of the company, said the plan will be tried for 60 or 90 days as an experiment. He said:

> We want more riders. It is often claimed that a greater number would ride the cars if the cost were less. If low fares stimulate riding, this experiment should make that fact obvious. The holder of the special Sunday ticket may have any rate of fare he desires merely by taking more rides.

Hearing Set to Discuss Sale of New York City Car Lines

An invitation was extended on June 3 by the Board of Estimate of New York City, N. Y., to every street car and trolley company operating in New York City to appear before the board at a public hearing on June 22 to initiate proceedings looking toward the sale of their property upon equitable terms to the city.

The actual resolution was that which was presented a week ago by former Comptroller Charles L. Craig and defeated through the negative votes of Comptroller Berry and President Julius Miller of Manhattan. It provided that a date be set for a public hearing to determine whether the Fourth and Madison and also the Eighth Avenue trolley lines constituted an "obstruction to traffic and an ill use of the street." The resolution was adopted on June 3 unanimously with an amendment that similar applications on the part of all other street car companies would be taken up at the same time.

I. C. Electrification at Chicago Nearly Completed

So rapid is the progress being made on the electrification of the Illinois Central Railroad's Chicago terminal that predictions made months ago that the first electric trains would be running by July 1 of this year will probably be definitely verified.

The first suburban trains to be changed over from steam to electric propulsion, according to an announcement by President C. H. Markham, will begin operation early in July between Randolph and 67th Streets. Construction forces have been increased until approximately 4,000 men are now employed in outdoor work on the terminal, in addition to large engineering and clerical staffs in the company's offices.

All overhead steel structures, involving the placing of 4,300 tons of steel, have been erected. The stringing of 293 miles of transmission wires and more than 100 miles of contact wire has already been completed. The company has tested 37 two-car units, while 60 more are soon to be tried out. Other equipment is set for early delivery.

Two car inspection plants, costing $650,000, will be completed by the middle of June. Temporary suburban station facilities are almost ready for use.

News Notes

Submitting Names in Worcester.—The contest is on until June 15 in Worcester, Mass., for a suitable name for the new monthly pamphlet issued by the Worcester Consolidated Street Railway. The name of the new publication together with the winner of the $10 prize will be announced in July.

Ride Free in Greensboro.—Meyer's department store in Greensboro, N. C., chartered all the cars and buses of the North Carolina Public Service Company for one hour on May 11, giving the residents of the city an opportunity to ride to the city free of charge. The store's annual anniversary sale began on that date.

Automatic Windshield Wipers for Indiana Cars.—Representatives of about twenty electric railways in Indiana who gathered on May 28 for a conference with members of the Public Service Commission at the statehouse agreed that within 90 days they would comply with a request from the commission to install automatic windshield wipers on all of their cars.

New Magazine in Toronto — The Toronto Transportation Commission, Toronto, Canada, is publishing a new house organ, called the *Coupler*. A commentator states that among its leading opinions is the difference between a coach and a bus—4 cents and a transfer.

$7,226 as Paving Share.—After deducting a claim of $577 against the Madison Railways, Madison, Wis., the finance committee of the Council voted to recommend that the company pay $7,226 to the city as its share of the cost of repaving and repairing the streets on which its lines operate.

Improves Properties at Resorts.—The Connecticut Company has awarded a contract to the H. Wales Lines Company, Meriden, Conn., for remodeling its pavilion at Lake Quassapaug, Middlebury. The improvement is in line with a general revamping of the company's properties at popular resorts.

Wage Settlement in Pottsville.—Employees of the East Penn Electric Company, Pottsville, Pa., won a partial victory on May 26 when the award of arbitrators was made known, ending the dispute which has been in progress since the beginning of this year. Wages of 61 cents an hour for operators of two-man cars and 67½ cents an hour for operators of one-man runs were allowed. On the question of paying the men for time engaged in eating, which was one of the chief objections of the company to the present schedule, a compromise was agreed upon. On the two-man cars there is no provision for pay, but this is retained on the one-man cars.

Illicit Use of Transfers.—"Bootlegging transfers" is the newest form of sport on the Seattle Municipal Railway, Seattle, Wash., and has resulted in the arrest of two men caught in an attempt to use a street car transfer not issued to them. E. A. Mitchell, public utilities traffic inspector, saw the men accept the transfer from two others. "Transfer bootlegging," Mr. Mitchell declares, robs the railway of large sums of money every year. He declares that members of the "transfer ring" get the slips, which they do not need, and dispose of them for small sums to regular "fences" at transfer points. The men arrested will be tried under the ordinance making it a misdemeanor to defraud by illegal use of a transfer.

No Fare Reduction for Des Moines in Sight.—If increases in the stabilizing fund of the Des Moines City Railway, Des Moines, Iowa, continue as they have the last seven months it will be three years before patrons can expect a reduction in fares. This situation was indicated in the April report for the company. The fund is now only $12,500, an increase of $4,176 in April and about the normal rate since the 10-cent fare became effective in October. The fund must reach $150,000 before the reduction is possible. The report shows 2,031,502 passengers carried in April and revenue of $190,395, while total revenue for the month was $198,690. Operating expenses, depreciation and taxes were $156,435.

Honor for Transit Man.—Frank L. Raschig, chief engineer of the Rapid Transit Commission of Cincinnati, Ohio, has been elected president of the Cincinnati Chapter of the American Society of Civil Engineers. For the past four years Mr. Raschig served as vice-president of the organization.

Foreign News

Buenos Aires Tramways Makes Report

Result of the operation of the tramway lines in Buenos Aires, Argentine Republic, which city has a population of 2,000,000 inhabitants, for the year of 1925 compared to 1924, is as follows:

Gross earnings:	1925	1924
Anglo-Argentine, surface..	$18,270,280	$18,321,600
Anglo-Argentine, subway..	2,368,880	2,287,360
Laeroze Company.....	3,307,960	3,243,160
Tranvias Electricas del Sud	129,440	124,240
Port and city of Buenos Aires.....	343,640	365,760

German Tramcar Accidents

Causes of accidents and the means of their reduction are dealt with at some length by A. Wolf in a recent issue of *Verkehrstechnik*. Taking as a basis the traffic accidents in Germany from 1899-1919, the figures relating to tramways show that 43.77 per cent of the accidents were sustained by passengers and 56.23 per cent by pedestrians. Of the total, only 8.38 per cent were due to tramway operation. The majority of passenger accidents were caused by boarding or alighting moving cars, sudden application of the brakes, and collisions. Folding steps and gates on the rear platforms would, he believes, reduce accidents due to the first cause.

Transportation in Chile.—Transportation facilities are on the up-grade in Chile. Valparaiso and San Antonio, rival seaport cities, are both connected with the inland metropolis and capital of the state, Santiago, by electric railway lines, the latter city having an advantage of proximity to the capital by a shorter railway haul. However, in Valparaiso an excellent tramway system serves the traveling public, and marked improvement has been shown since the city authorities have had the streets straightened and paved. Funicular railways are used also, to carry the pedestrians from the lower street levels of Valparaiso to the higher ones, because of the abruptly rising hills. Buses, too, will be in more demand and used to a greater extent because of the automobile highway, nearing completion, which will cover these routes.

English Company to Be Bought.—The City Council of Worcester, England, has decided to purchase the tramway of the Worcester Electric Traction Company. It is hoped that this will be done by agreement with the company at a price of about £60,000, so that the cost of an arbitration may be avoided. The Council has introduced a bill before Parliament to give it authority to work the tramways.

Recent Bus Developments

Ordinance Would Provide Tax for Bus Companies

The City Council of Buffalo, N. Y., has directed the city law department to draft an ordinance requiring all bus companies engaged in passenger transportation over city streets to pay the city a percentage of their annual receipts to provide funds for the upkeep of pavements on streets over which the buses operate. In the event that the city law department rules such an ordinance illegal, the Council indicated it would amend all existing bus franchises to provide for the payment of the tax.

According to Commissioner Frank C. Perkins, the large double-deck buses operated by the International Bus Corporation, a subsidiary of the International Railway, Buffalo, are destroying the pavement of the streets over which they operate. Buses have been forced to alter their routes to avoid pavements condemned by the city engineering department. Property owners along several parkways and streets told the municipal authorities that the buses alone have been responsible for the damage done to the pavements. Due to the damage, the Council has voted to repave several streets over which buses operate and one-half the cost will be paid from the general fund of the city and the balance will be assessed against abutting property owners.

Members of the City Council believe the International Bus Corporation should be required to pay a special tax which would be sufficient to guarantee part of the maintenance of these streets. The company's application for a rehearing before the commission on this order has been denied. B. J. Yungbluth, president of the International, says the company has no funds with which to make the improvements.

Substitution of heavy pneumatic tires for solid rubber tires on all double-deck buses of the International Bus Corporation was proposed by the City Council as a means for reducing the damage being done to the city pavements.

Cross-Town Service in Des Moines —No Independent Bid

The Des Moines City Railway, Des Moines, Iowa, has put in crosstown service three new 25-passenger buses of latest design. They have a White engine and chassis upon which is mounted a body built by the Bender company of Cleveland.

Officials of the Capital City Motor Coach Company, who announced several months ago that they would ask the City Council for a franchise to operate here, have made no public request as yet for a permit to operate, although the new Council took office the first week in April.

M. H. Cohen, attorney for the company and a stockholder, said he has interviewed individual members of the Council and expects soon to ask for a permit. In some quarters, however, the continued delay on the part of the bus company executives is interpreted to mean that Mr. Cohen has been unable to secure the promise of enough votes to put the Council on record for buses.

Seeks to Restrain Line

The Amalgamated Association has filed a bill in equity in the Supreme Court at Boston, Mass., to prevent Franklin T. Miller, receiver for the Boston & Worcester Street Railway, from operating a bus line between Boston and Worcester. It is stated that the agreement between the railway and the union provides that at the introduction of a new method of transportation, the matter of the status of the employees would be settled by a conference between members of the union and officials of the company. The operation of buses instead of street cars is a new method of transportation on the route between Boston and Worcester by the railway and, according to the union, becomes subject to discussion under the agreement. It is further brought out that such transportation jeopardizes positions now held by members of the association, and the union proposes to protect its members.

Rules on Standees, Hours and Brakes in Massachusetts

Rules have been adopted by the Massachusetts Department of Public Utilities to cover the number of passengers to be permitted to stand in buses, to govern the number of hours employees are to be permitted to work and to fix the equipment of brakes that shall be provided. On the question of the limitation of the number of standees the commission said:

> Passengers in excess of 25 per cent above the seating capacity of the motor vehicle shall not habitually be carried. Where the number of passengers regularly applying for transportation exceeds that above provided for, it shall be the duty of the licensee to furnish additional facilities to carry such passengers.
>
> In no event shall standing passengers be carried a distance in excess of 15 miles. The use of portable seats for passengers on any motor vehicle shall not be allowed.

On the hours of service of operators the regulations read:

> No owner of a bus shall cause or allow any operator to work as such for more than ten hours in any period of sixteen consecutive hours, except in cases of emergency.

On the question of brakes the commission said:

> Every bus shall be provided with at least two brakes, powerful in action and separated from each other, of which one brake shall act directly on the driving wheels or on parts of the mechanism which are firmly connected with said wheels. The service or foot brake shall suffice alone to stop the bus within a distance of 45 ft., and the emergency or hand brake shall suffice alone to stop the bus within a distance of 100 ft. when the vehicle is moving at a speed of 20 m.p.h., on a dry level road. One of the two brakes shall be so arranged as to be operated by the foot. One shall be a ratchet brake which can be set when the operator leaves the bus. Brakes shall at all times meet with the requirements of any tests made by the department, its representatives or other authorized persons.

Seattle Bus Purchase Still Uncertain

Protests by organized labor have failed to shake the City Council of Seattle, Wash., in its determination, reached more than a year ago, to replace with a municipal bus line the privately-owned buses operating on Tenth Avenue Northeast. But the Council is still unable to agree as to how the fourteen buses shall be purchased, although the $80,000 for their purchase was appropriated months ago. A proposition is now before the Council utilities committee, sponsored by two Councilmen, providing for appropriating $55,000 to purchase fourteen chassis of designated makes, with an understanding that the bodies were to be built by the municipal railway in its shops. Other members of the Council think that bids should be called for the buses complete, while a minority think that bids should be called separately for bodies and chassis.

The Central Labor Council meanwhile has appealed to the Council, urging that the F. M. Peterson bus line, which for years has furnished service on Tenth Avenue Northeast, be permitted to continue operation. They base their claim on the allegation that patrons prefer the privately-owned bus line to a municipal line. and that under municipal ownership the bus line, operated by the municipal railway department, would add to the annual deficit from the city's various bus lines. The Council feels, however, that since the city is in the transportation business, it should have a monopoly of that business. It is also pointed out that from the 10-cent fare collected, the bus line gets 7½ cents and the municipal railway only 2½ cents, although the haul on the car lines is much longer than that on the buses.

Bus Bids in New York to Be Considered June 14

Probability of any award of bus franchises in New York City before July 1 was diminished on June 1, when the Board of Estimate postponed consideration of several applications until June 14, the date of the last stated meeting of the board before the summer vacation. All these applications were for individual routes instead of for the so-called bus systems, proposed by the Board of Transportation.

Hornell to Have Buses July 1

Buses will supplant trolleys in Hornell, N. Y., after July, when the Hornell Traction Company will suspend operations after years of service at a deficit. The Hornell Council has granted the application of Raymond E. Page, receiver for the railway, for a fifteen-year franchise to operate buses in place of the electric railway that has served the city for 35 years. Virtually the same service as maintained by the trolleys will be kept by the buses. Mr. Page stated that about $50,000 would be invested for equipment for the new bus line and that the trolleys would be kept running until the buses arrive. Application also will be made by Mr. Page for permission to operate buses between Hornell and the neighboring city of Canisteo to replace the present interurban railway.

Stockholders in the Hornell Traction Company will receive nothing and bondholders about 10 cents on the dollar when the affairs of the company are wound up. There is about $120,000 in stock outstanding and $150,000 in bonds, on which about $25,000 in interest is due. The system had been in receivership for some time.

Hearing on Illinois Bus Project Deferred

The petition of the Western Motor Coach Company, recently organized by Britton I. Budd, president of various Insull electric railway properties, which was scheduled for hearing on May 26 before the Illinois Commerce Commission, was deferred until June 15. The Western Motor Coach Company has applied for a certificate of convenience and necessity to operate buses on four main routes out of Chicago, following in general the line of the Chicago, Aurora & Elgin Railroad and supplementing that service. It will operate as far as Aurora, Geneva and other points in the Fox River Valley. This project was referred to previously in the ELECTRIC RAILWAY JOURNAL.

Trolleys Replaced in Winfield.—Railway service in Winfield, Kan., supplied by the Arkansas City-Winfield Northern Railway was abandoned on May 25. Buses will replace the railway line. The bus fare is 8 cents with two tickets for 15 cents, against the railway rate of 7 cents.

Buses Supplant Cars.—Electric railway service will be discontinued in Phenix City, Ala., following permission by the Alabama Public Service Commission. Buses will be substituted to be operated by the Columbus Electric & Power Company. The railway line in Phenix City is owned and operated by the Columbus Electric & Power Company, which company owns and operates the railway lines in Columbus, Ga., just across the Chattahoochee River from Phenix City. The company gave as its reason for discontinuance the fact that the cars no longer paid.

Seeks to Buy Bus Competitor.—The Cincinnati, Lawrenceburg & Aurora Electric Street Railroad, which operates between Cincinnati and the Indiana state line, has asked the Ohio State Public Utilities Commission for authority to purchase the certificate of the Indiana Bus Company. The bus company is a competitor of the interurban.

How the Buses Are "Panning Out."—The Chicago & Joliet Transportation Company, operating buses in the Joliet, Ill., district, recently opened a newspaper campaign to inform customers of the results of bus operation. April figures were printed showing a loss of $1,756, not including charges of interest on investment, depreciation or reserve. Operating revenue was $5,804 and expenses $7,560. There were 66,133 passengers, with an average revenue of 8.8 cents, carried at a cost of 11.4 cents. Coach-miles were computed at 28,850, with the revenue 20 cents a coach-mile and the expense 26.2 cents. The company explains its publication of the figures in this wise: "Motor coach patrons will be interested to know how the line which operates in their vicinity is 'panning out.'"

Supreme Court to Pass on Holyoke Issue.—The Interstate Buses Corporation of Connecticut has taken its appeal to the Supreme Court at Washington in its fight against the Holyoke Street Railway, Holyoke, Mass., which recently obtained an order from the Massachusetts courts restraining the bus company from operating buses in unfair competition with the street cars. The Supreme Court refused to grant a temporary order to allow the buses to continue operations, but has consented to hear the case, which is scheduled for Oct. 4.

Seeks Permission for Bus Line.—The International Railway, Buffalo, N. Y., has filed a petition with the City Council for permission to operate a passenger bus line in Walden Avenue from Bailey Avenue to the easterly city line. The petition says the company desires to operate the Walden Avenue bus line in conjunction with the proposed Best-North Street line, for which a petition for a franchise is now pending in the Council.

Buses Will Replace Car Line.—The Michigan Electric Railway recently notified the City Commission of Owosso and the Corunna City Council that it would abandon service in and between the two towns and tear up its rails. The company said the line had been a losing venture and that it could no longer comply with the requirements of its franchise. Bus service will be substituted for the street cars. The buses will be operated by the Owosso-Flint Bus Line, Inc., an Owosso, Mich., company.

Permits Secured for Bus Operation.—Having obtained all necessary local licenses and state certificates, the New England Transportation Company, subsidiary of the New York, New Haven & Hartford Railroad, has started a bus line connecting Boston, Walpole, Wrentham, North Attleboro, Pawtucket and Providence. The company has opened a terminal at 36 Park Square, Boston. Coincident with the through operation between Providence and Boston, shuttle service between Boston and Wrentham was put in operation. The buses are driven by operators formerly employed by the New York, New Haven & Hartford Railroad. Regular railroad fare tickets are honored on the buses.

Seeks to Substitute Buses.—The Madison Railways, Madison, Wis., has applied to the Wisconsin Railroad Commission for permission to abandon its tracks on Harrison Street and to operate buses from Regent Street to the west city limits. Residents will be furnished service at more frequent intervals. The city of Madison plans to pave Harrison Street this year. It will be necessary for the railway, if it continues its old route, to share in the paving costs. The company plans ultimately to double track Regent Street to the west city limits and abandon Harrison Street, so that the officials do not see the justice in asking the company to pay for paving its share of a street that it will soon abandon.

Financial and Corporate

Traffic in Capital Stabilized

Washington Company Believes Downward Trend Over—Large Sums Spent for Maintenance

For the year ended Dec. 31, 1925, the balance of income of the Washington Railway & Electric Company, Washington, D. C., credited to profit and loss was $404,226. To this was added other miscellaneous items, making the total credited to profit and loss during the year $644,857. This figure compares with $258,035 for the year 1924. The financial situation of the company was made the subject of the report of President Ham at the annual meeting held on Jan. 16.

During the year 1925 the company's system carried 101,829,572 passengers, of whom 24,323,936 were carried on transfers, leaving 77,505,636 revenue passengers. This indicates a decrease in revenue passengers of 281,039, or only about one-third of 1 per cent, compared with the revenue passengers carried during the year 1924. This is a relatively small decrease compared with that suffered annually since 1919, indicated in the accompanying table.

STATEMENT OF PASSENGERS CARRIED BY WASHINGTON RAILWAY & ELECTRIC COMPANY

	Revenue Passengers Carried	Decrease Compared With Previous Year
1919	91,488,735	
1920	87,782,784	3,705,951
1921	85,481,656	2,301,128
1922	82,716,756	2,764,900
1923	81,518,607	1,198,149
1924	77,786,675	3,731,932
1925	77,505,636	281,039

Although the operations of the company and its subsidiary railway companies with the present fare of 8 cents cash, or tickets at the rate of six for 40 cents, indicate a return of less than 4 per cent on the value of the property within the District of Columbia, fixed by the Public Utilities Commission, the company continued in 1925 the practice of recent years of expending large sums of money on track renewals and repairs. Maintenance of way and structures, together with allowances for depreciation, totaled $981,792. The more important projects completed in 1925 were the renewal of rails and substructure on 1.69 miles of underground construction and renewal of rail and paving on practically 7½ miles of overhead construction, which projects alone cost $469,681. With respect to the rolling stock of the company, two snow sweepers and 24 buses were added during the year at a cost of $177,897.

On the safety contest started in 1921 and continued during 1925 the report says the constant increase in the use of automobiles was a most important factor. Due to this, and to the unusually inclement weather the early part of 1925, that year was one of the most difficult, from the standpoint of safety in operations. These conditions brought about a slight increase in the number of accidents occurring in 1925 compared with the previous year. It is noted that 74 per cent of all accidents were with automobiles. Efforts of the company to draw the attention of the public to the need of care in all street movements, through posters and otherwise, aided in keeping the accidents down. The expenditures for settlements of claims was but 2.76 per cent of total operating revenues for the year.

The total outstanding bonded indebtedness of the Washington Railway & Electric Company and subsidiary companies, including the Potomac Electric Power Company, is now $26,282,900, which, added to the $15,000,000 capital stock of the parent company, and $2,093,750 outstanding capital stock of subsidiary companies, makes the total outstanding capitalization Dec. 31, 1925, $43,376,650. This excludes bonds purchased for the sinking funds and for temporary investment.

The total payroll for 1925 of the Washington Railway & Electric Company and subsidiary companies, including the Potomac Electric Power Company, was $4,659,090, an increase over the previous year of $377,843. The number of employees in the service of the company's system as of Dec. 31, 1925, was 2,979.

The figures for 1925 in the accompanying comparative table are subject to revision upon final audit.

COMPARATIVE STATEMENT OF WASHINGTON RAILWAY & ELECTRIC COMPANY

	1925	1924
Gross earnings from operation	$4,775,285	$4,759,243
Miscellaneous income (including dividends from Potomac Electric Power Company)	1,025,501	858,802
Gross income	$5,800,785	$5,618,045
Operating expenses (including depreciation), taxes and miscellaneous charges	$3,915,959	$3,820,621
Interest on funded and unfunded debt	730,600	790,675
Payment of dividend on 5 per cent preferred stock	425,000	425,000
Payment of dividend on common stock	325,000	325,000
	$5,396,559	$5,361,297
Balance of income for year 1925, credited to profit and loss	$404,227	$256,748
Miscellaneous items credited to profit and loss	240,630	1,287
Total credited to profit and loss during the year	$644,857	$258,035

In discussing the use of the bus by the company President Ham said:

> The additional buses acquired now bring the total available for operation, as auxiliaries to our street car service, to 44. During 1925 we augmented the rail service by inaugurating four new bus lines. Upon completion of the highway from Bladensburg School to East Riverdale, Maryland, in August, 1925, we extended the bus operations of the Washington-Interurban Railroad to East Riverdale, thereby completely abandoning rail operations on this line.
>
> All of our bus service is operated in coordination with rail service and, while operated at a direct loss, has added materially to the convenience of the public. We realize that through the use of buses new avenues of traffic may be opened up, thereby extending a wider use of all transportation facilities. We are constantly studying the needs of additional bus transportation and since Jan. 1, 1926, have placed in service a new bus line, known as the Rhode Island Avenue Coach Line, operating between Fourth Street and Central Avenue, Northeast, to Nineteenth and "H" Streets, Northwest.

U. S. District Court Must Decide Seattle Tax Issue

The suit of the Old Colony Trust Company against the city of Seattle, Wash., which involved taxes charged against the street railway and light and power properties of the Puget Sound Power & Light Company in 1919, was not a suit against the state of Washington but against alleged harmful acts of agents of the state and hence properly could have been brought in a federal court. The Supreme Court decided this issue on June 1, reversing the decree of the district court which had dismissed the bill for lack of jurisdiction on the ground that it was a suit against the state. The effect of the decision, rendered for the court by Justice Van Devanter, is to send the case back to the United States District Court of Washington for trial.

Early in 1919, the Puget Sound company owned and operated both the street railway system and the electric light and power system of Seattle. It transferred the street railway system to the municipality in March that year under a contract which specified that state, county and municipal taxes should be borne proportionately for the year. The city later refused to pay any part of the taxes against the properties, the bill for the year having been rendered and charged against the company prior to the transfer of the street railway properties. The county treasurer threatened to proceed against the electric light and power system for the full amount of the taxes charged to both systems for the full year. The Old Colony Trust Company filed suit to stop proceedings by distraint and sale, acting as trustee for a mortgage issue of bonds on the light and power system issued in 1921. The tax bill aggregated $400,000, of which $179,000 was for municipal taxes. Under the contract for transfer of the street railway, three-fourths of the taxes were to have been charged to the municipality.

Decreased Earnings in Ottawa

The Ottawa Traction Company, Ottawa, Canada, received from the Ottawa Electric Railway during 1925 $279,075, with which were paid the usual quarterly dividends of 1 per cent and a bonus of 1 per cent. This fact was disclosed in the twelfth annual report of the Ottawa Traction Company for the year ended Dec. 31, 1925. The report itemized the work done during the year in modernizing the plant.

President T. Ahearn in his address to the stockholders said he regretted that the report was not so good as the shareholders were accustomed to receive in that it showed a substantial decrease in gross earnings compared

with 1924. He stated that in carrying out the terms of its new contract with the city the company had spent a very large amount in improving and extending the system, but that the second year of the contract had just been completed and the results for both the first and second years were much less favorable than those forecast in the report of the city's expert. In this connection he called attention to the possibility of an application for increased fares at the end of the current five-year period. He reiterated the policy of the company to maintain the 5-cent fare in Ottawa if possible and expressed the hope that improved business conditions would enable that policy to be continued.

One of the causes for decreased receipts, he pointed out, was from the operation of buses to and from points outside the city limits. The inroads being made by this competition, if unchecked, would in itself result in increased street car fares. The manager had recently brought the matter to the attention of the Board of Control.

Balance in Oakland $284,194

The passenger revenue of the Key System Transit Company, Oakland, Cal., for the year 1925 decreased $26,694 compared with 1924. The number of passengers carried increased 808,852. The decrease in revenue and increase in passengers carried are explained by the additional passengers taking advantage of the commuter rates, which are lower than regular rates and free transfers. Transportation expenses increased $97,715. The increase of $74,419 in transportation and power expenses added to the decrease of $26,694 in passenger revenue resulted in a net loss of $101,114.

These facts are contained in the annual report of the company for the year ended Dec. 31. C. O. G. Miller, president, stated that as the earnings of the company continued to be satisfactory from the standpoint of operation and the bondholders, they are still inadequate to yield a fair return to the stockholders on their investment and give a fair return on the value of the property devoted to public service.

The company provided additional service to the extent of 207,476 passenger-car-miles and 506,349 bus-miles. The motor coach service performed by the company at regular street car rates with free transfer privileges is resulting in a net annual loss of approximately $124,000. Net additions to the company in 1925 totaled $355,244. The year was marked by important reconstruction work and the purchase of new equipment. As a result of arbitration proceedings between the company and the platform men, an award of the eight-hour day with increased pay an hour was put into execution at the beginning of the new year.

The costs and revenues from Key System bus operations were as follows: Bus-miles in 1925, 850,111; 1924, 340,479; receipts in 1925, $82,076; 1924, $24,145; drivers' wages in 1925, $49,376; 1924, $20,278; other direct costs in 1925, $114,103; 1924, $43,274; state gross receipts tax in 1925, $4,308; 1924, $1,266; overhead in 1925, $29,522; 1924, $11,698; interest on investment in 1925, $9,004; 1924, $4,082; total cost in 1925, $206,315; 1924, $80,601; net loss in 1925, $124,238; 1924, $56,456; passengers carried in 1925, 2,261,739; 1924, 703,641.

INCOME ACCOUNT OF THE KEY SYSTEM TRANSIT COMPANY

For the Year Ended Dec. 31, 1925

Gross operating revenue		$7,289,871
Operating expenses:		
Way and structures	$439,349	
Equipment	564,310	
Power	668,642	
Conducting transportation	2,873,807	
Traffic expenses	21,334	
General and miscellaneous	679,293	
Transportation for investment and construction overhead (credit)	67,542	5,179,194
Net operating revenue		$2,110,676
Less taxes		444,032
Operating income		$1,666,644
*Add-non-operating income		211,560
Gross profit		1,878,204
Sundry charges:		
Depreciation	$689,035	
Amortization of franchises	8,762	
Abandonment of obsolete equipment	1,395	699,193
Balance, current operations		$1,179,011
Deductions:		
Bond interest	$789,757	
Other interest	12,502	
Miscellaneous	22,636	824,896
Surplus, current operations		$354,114
Profit and loss adjustments		35,490
Surplus		$389,604
Surplus from prior year		308,207
Total surplus		$697,811
Less four quarterly prior preferred dividends paid		413,617
Balance to surplus account		$284,194

*Includes $126,408 net revenue, Key System Service Company.

STATISTICS OF THE KEY SYSTEM TRANSIT

For the Year Ended Dec. 31, 1925

Passengers carried:		
Traction division:		
Cash and ticket fares, 6 cents		73,491,050
School tickets, 3 cents		1,987,617
Commutes (East Bay cities)		617,613
Miscellaneous, 12 cents, 18 cents, etc		1,189,953
Total revenue passengers		77,286,233
Free transfer passengers		21,568,238
Total revenue and transfer passengers		98,854,471
Key division:		
Transbay fares, 18 cents	8,724,479	
Commutes, transbay	8,037,406	
Children's fares, 10 cents	212,678	
San Francisco-Sacramento Railroad tickets	237,033	
Miscellaneous transbay tickets	33,259	
Total transbay passengers		17,244,855
Fares (East Bay cities), 6 cents	531,768	
School tickets, 3 cents	43,488	
Total passengers (East Bay cities)		575,256
Total revenue passengers, key division		17,820,111
Entire system:		
Revenue passengers		95,106,344
Revenue and free transfer passengers		116,674,582

Rockford Bonds Must Be Deposited by June 15

Robert W. Baird, chairman of a committee representing the owners of the 5 per cent first mortgage gold bonds of the Rockford & Interurban Railway, Rockford, Ill., announced on May 27 that the committee had fixed June 15 as the limit of time in which bonds might be deposited under the protective committee agreement. The formation of the protective committee of bondholders really dates back to Nov. 1, 1925. Subsequent to the formation of the committee approximately $1,000,000 of bonds was deposited with the committee. The committee then deposited $365,000 of the deposited bonds with the Continental & Commercial Trust & Savings Bank of Chicago, as trustee under the deed of trust securing the Rockford & Interurban bonds and pursuant to the provisions of the deed of trust requested the trustee to institute foreclosure proceedings. Upon receipt of this request the trustee applied for the appointment of a receiver and on Feb. 15, 1926, Adam Gschwindt was appointed receiver of the properties of the Rockford & Interurban Railway and the Rockford City Traction Company, security for the Rockford & Interurban bonds. The receiver is now operating the properties covered by the trust deed.

$1,663,698 Loaned to City by Detroit Municipal Railway

During April the Department of Street Railways loaned the city of Detroit, Mich., $1,663,698 on demand notes of the city bearing interest at 4 per cent. William M. Hauser, auditor, made this fact public in presenting the financial statement of the department for the month. This money was loaned out of the various funds of the department as follows:

Sinking fund	$413,698
Interest fund	450,000
Injuries and damages fund	800,000
Total	$1,663,698

The Department of Street Railways would receive only 3½ per cent on this money if it were left on deposit in the banks, while the city of Detroit would be compelled to pay 4.10 per cent to 4.25 per cent if it had borrowed from the banks. Mr. Hauser regards this arrangement as beneficial to both the general taxpayer and the car rider.

The auditor further pointed out that in the report for March, 1926, attention was drawn to the fact that the department had $49,612 available for future capital costs. The amount available for future capital costs at April 30, 1926, is $196,503. In other words, the Department of Street Railways' investment has been brought back to the position where it shows an equivalent in property and equipment for all the money that was put into it, and a surplus of $196,503, an amount by which current assets are in excess of its current debt.

The outstanding bonds, including the Detroit United Railway obligation at April 3, 1926, are given as $37,131,000. There is accumulated in the sinking funds, consisting of cash and securities, $6,059,600 at April 30, 1926, toward paying this debt, so that the net debt remaining to be paid is $31,071,099. The department has an investment in road and equipment of $44,456,472, on which $31,071,099 remains to be paid. The difference between these two amounts, $13,385,373, represents the equity of the city of Detroit in its transportation facilities, and the amount that has been contributed by the car riders toward establishing a city asset represented by its railway system.

The balance of net income for April,

1926, is $74,587 after the payment of sinking fund charges. The balance of net income for the month of April, 1925, was $74,360, so that the past month shows an increase of $226 over that for April, 1925.

During April, 1926, 43,665,806 passengers were carried by the rail lines and 1,745,087 by the coach lines, a total of 45,410,893 passengers, compared with a total of 40,858,694 in April, 1925, divided 40,190,694 rail lines and 668,231 coach lines. In other words, the department carried 4,551,968 passengers, or 11.1 per cent more in April, 1926, than in April, 1925.

Net Income Improves in Buffalo.—For the three months ended March 31, 1926, the operating revenue of the International Railway, Buffalo, N. Y., was $2,709,594, compared with $2,568,482 for a similar period in 1925. Operating expenses and taxes decreased from $2,342,858 in 1925 to $2,283,271 in 1926. The 1925 expense figure was adjusted to include 3 cents an hour additional wage paid on Dec. 31, 1925, and retroactive to Jan. 1, 1925. The net income after the consideration of income deductions was $64,298 for the three months period to March 31, 1926, against a deficit of $149,741 for the three months period ended March 31, 1925.

Net Income Higher.—For the four months period ended April 30, 1926, the railway operating revenue of the Eastern Massachusetts Street Railway, Boston, Mass., was $3,335,607, against $3,274,637 for a similar period last year. The operating expenses fell from $1,971,149 to $1,941,691. The net corporate income carried to profit and loss is $344,092 for the four months period of 1926, compared to $299,821 for the four months period ended April 30, 1925.

Increase Scope of Service.—The British Columbia Electric Railway, Vancouver, B. C., has acquired the plant of the New Westminster Gas Company and will in future supply this commodity to the residents of the Royal City. The transaction marks the passing of one of New Westminster's early industries, although the plant will continue to be operated and will be improved. The gas works has about 12 miles of mains in New Westminster. A few years ago a plebiscite was submitted to the ratepayers for the purchase of the industry. The proposal carried, but the scheme never reached fruition.

Passenger Travel in Memphis Increases.—During the present year the number of passengers on the lines of the Memphis Street Railway, Memphis, Tenn., has been consistently increasing over the corresponding months of 1925. The increased riding, however, has not been sudden, as is indicated in a comparison of the months of December, November and October, 1925, with similar months of the previous year. The *Tri-Service News*, the official paper of the Memphis Power & Light Company, says the increase indicates that people are more and more acknowledging the street car as the most economical as well as safest and most convenient means of transportation in regular travel. Although the number of passengers has shown a considerable decrease over a period of about four years, the company hopes now that the tide has turned and that an improvement may be shown indicating larger patronage to the cars.

Applies to Abandon Two Branches.—The Cleveland Southwestern Railway & Light Company, Cleveland, Ohio, has filed application with the Ohio Public Utilities Commission for permission to abandon the Amherst and Grafton branches of its railway. The Grafton branch runs from Elyria, Ohio, to Grafton and the Amherst branch from Penfield Junction to Amherst. The company claims these branches are being operated at a loss.

Toronto Loses Interest Appeal.—The city of Toronto lost its appeal in the first divisional court at Osgoode Hall in its effort to collect interest on the $500,000 deposited into court during the arbitration proceedings between the city of Toronto, Ont., and the Toronto Street Railway. The city of Toronto appealed against the decision of Mr. Justice Grant, who decided against the city's action to recover interest on the $500,000. The city appealed to the first divisional court at Osgoode Hall, and five separate judgments were delivered by their lordships on the bench. While separate judgments are being given, Chief Justice Mulock, Mr. Justice Hodgins, Mr. Justice Smith and Mr. Justice Ferguson all decided that the appeal should be dismissed.

Bids for Property on June 17.—The Exeter, Hampton & Amesbury Street Railway, Exeter, N. H., has been granted permission by the Public Service Commission to abandon its lines and sell its property. The railway operates about 22 miles of line in the towns of Exeter, Hampton, Hampton Falls and Seabrook, N. H. Bids on this property will be receivable at once and acceptance of the highest bid or bids will be made on June 17 for the whole or any part of the equipment and rails. Bids must specify whether the offering party intends to junk the line or continue railway operation.

April an Encouraging Month.—For the first time this year the Oklahoma Railway, Oklahoma City, Okla., in April made more than enough money to pay its operating expenses, its taxes and its interest charges, according to the monthly report of W. C. Jones, auditor. There was a balance of $625 after paying expenses, the report shows. Increased freight revenues are helping to reduce the company's deficit, officials pointed out. The company is now making special efforts further to increase its revenues through freight service with the hope of being relieved from receivership as soon as possible.

Net Income Increases in Baltimore.—The net income of the United Railways & Electric Company, Baltimore, Md., during April of this year totaled $81,049, compared with $65,964 for April, 1925. For the first four months of this year the net income after fixed charges was $281,708 an increase of $63,340. Gross revenue in April was $1,421,965, compared with $1,414,058 for April of last year. Gross revenues for the first four months this year were $5,579,622 or $50,686 more than for the first four months of 1925. The operating expenses totaled $846,249, a decrease of $10,662.

Four-Mile Line to Suspend. — The Missouri Public Service Commission has authorized the Grand View Railroad, a 4-mile electric railway between the southern city limits of St. Louis and the Alpha Portland Cement Company's plant on the Lemay Ferry Road in St. Louis County, to discontinue and abandon the line. The property will be junked. The company reported an annual net deficit of $1,200 in 1924 and 1925 despite a subsidy of $3,000 from the cement company. This bonus was stopped on Jan. 1, last.

Book Reviews

Electric Railway Practices in 1925

A summary of the most significant features of presentations by electric railways to the Charles A. Coffin Foundation; edited by Henry H. Norris with an introduction by John N. Shannahan. American Electric Railway Association, New York. 233 pages, exclusive of appendices and index.

This volume is uniform with similar volumes published in 1924 and 1925. It places on record in detail the practices and methods of most general interest followed by the electric railways which competed last year for the Charles A. Coffin prize. The volume, like the others in the series, is well arranged and indexed. The chapter headings selected are twelve in number as follows: Furnishing Better Transportation Service; Improved Operating Practices; Getting Closer to the Public; Selling the Service; Advertising as an Aid in Selling Service; Recent Types of Cars and Buses; Improved Operating Practices; Recent Maintenance Methods; Improving Electric Railway Construction; Securing the Co-operation of Employees; Bettering the Accident Record; Electric Railway Financing.

The material presented in last year's briefs is of unusual value. While it was abstracted at length in the technical press shortly after the award, the reappearance of the material in book form in greater detail, with the information carefully collated and grouped under subject heads, gives another use for it.

As the Coffin competition for electric railways has more than established its value in stimulating interest in improvement, it might be worth while to consider somewhat more definitely than has been done in the past the fields being filled by this book and another with a somewhat similar name, also published by the association, namely, "Handbook of Modern Electric Railway Methods and Practices, 1925." If the latter is to be issued annually in the future, it might be well to see whether the titles could not be differentiated more than at present or the material combined in a single annual volume.

Legal Notes

CALIFORNIA—*Leased Trucks Held to Be Common Carriers.*

Some truck owners leased their trucks to shippers at a certain daily rate, but with such other provisions as to the rate that the Public Service Commission held they were common carriers. As such, they came under the Auto Stage and Truck Act, which requires certain duties of such carriers. This contention of the Railroad Commission was upheld in spite of the fact that the trucks were not operating between fixed termini and over regular routes. [Holmes et al vs. Railroad Commission et al., 242 Pacific Rep., 486.]

CONNECTICUT — *Duty to Passenger in Perilous Position.*

The plaintiff was standing on the running board of a moving trolley car and was struck by a standing truck. In confirming the verdict for the defendant, the Supreme Court of Errors defined the duty of a railway to its passengers by quoting from the decision of the trial court, which said, in part: "A railway is not an insurer of passengers' safety, but must use the utmost care to avoid injury to such passengers that a reasonably prudent person would use under such circumstances." [Dwyer vs. Connecticut Co., 131 Atlantic Rep., 838.]

FEDERAL CIRCUIT COURT—*Contract of Street Railway to Pay Half of Cost of Maintaining Gates at Steam Railroad Crossing Has Consideration.*

A contract, by which a street railway company agreed to pay a steam railroad one-half of the cost of maintaining gates at the intersection of their tracks, will not be voided on the plea that the contract lacked mutuality or was without consideration. [Northern Ohio T. & L. Co. vs. Erie R.R., 8 Federal (2d) 962.]

FEDERAL CIRCUIT COURT—*That Private Interests Were Benefited or That They Defrayed Expenses of Relocating Highway Held Not to Affect Validity of Condemnation Under Right of Eminent Domain.*

A railway agreed with county authorities to donate certain land for a new highway and to build a large power station at a certain point if the authorities would abandon a portion of the old highway which obstructed the construction of the power station. The agreement was carried out, but the owner of some real estate which was condemned by the county commissioners brought suit on the ground that the change in location was dictated because of the benefit to private interests and so was a violation of the fifth and fourteenth amendments of the Federal Constitution. The Circuit Court of Appeals of the Sixth Circuit held, however, that the mere fact that private interests were served or that they defrayed in whole or in part the expenses of the relocation of the highway or other improvements would not affect the validity of the proceedings, and in this case the change in location was justified from the public interest. [Weaver vs. Pennsylvania-Ohio P. & L. Co., 10 Federal (2d), 759.]

FEDERAL DISTRICT COURT—*Intra-state Business of Interstate Bus Company Prohibited*

Greenfield, Mass., contended that it could do an intra-state business in Massachusetts without complying with the provision of the Massachusetts statute for the regulation of motor buses, but this was forbidden by the Federal District Court of Massachusetts. [Holyoke Street Railway vs. Interstate Buses Corporation, et al., 11 Federal (2d.), 161.]

FEDERAL SUPREME COURT — *Delay in Ending Confiscatory Rates May Constitute Confiscation*

In a case where a public service commission did nothing for two years to increase telephone rates after the Federal Circuit Court had reversed an earlier order of the commission, the Supreme Court said that "property may be as effectively taken by long continued and unreasonable delay in putting an end to confiscatory rates as by an expressed affirmance of them." [Smith et al. vs. Illinois Bell Telephone Co., 46 Supreme Court Rep., 408.]

FEDERAL SUPREME COURT — *Right of Interstate Railway to Abandon Unprofitable Intrastate Branch*

The Interstate Commerce Commission has power to authorize a railroad chartered by a state and engaged in both interstate and intrastate commerce to abandon a branch line located wholly within the state, when this line cannot be operated except at a loss. This authority arises from the power of Congress to free interstate commerce from unreasonable burdens. [State of Colorado vs. United States et al., 46 Supreme Court Rep., 452.]

FEDERAL SUPREME COURT—*Reasonable Return and Excessive Depreciation*

A public utility company, which because of excessive depreciation in the past has created a reserve depreciation account greater than that required adequately to maintain its property, cannot be compelled to apply a part of the property or money represented by such reserve to overcome a deficit in present or future earnings or to charge low rates which otherwise could not be sustained. The just compensation, safeguarded to a utility by the Federal Constitution, is a reasonable return on the value of the property used at the time that it is being used for public service, and the protection does not depend on the source of the money used to purchase the property. Past losses cannot be used to support a claim that present or future rates are confiscatory, nor can profits of the past be used to sustain confiscatory rates for the future. [Board of Pub. Util. Com. et al. vs. N. Y. Tel. Co. 46 Supreme Court Rep., 363.]

IOWA—*Doors Opened Before Car Stopped*

As a car was approaching the destination of a passenger he stepped in front of the door and the conductor opened it, although the car was still moving. In attempting to alight, the passenger fell and was injured. The court gave an extendod review of decisions in similar cases and concluded in this case that the question of contributory negligence was a matter for decision by the jury. [Fitzgerald vs. Des Moines City Railway, 207 Northwest. Rep., 602.]

KANSAS—*Pedestrian Crossing Street Is Negligent if He Fails to Look for Car Approaching*

A pedestrian undertook to cross a street on which there were two car-tracks. He crossed the first safely, but while on the second track he was struck by a street car, which required 60 ft. to stop and which, as he stepped on the second track, was 30 ft. away and coming toward him at the rate of 20 m.p.h. His failure to look out for the approaching car was held to be negligent, as a matter of law, precluding a recovery. The fact that his attention was attracted to a car approaching from the opposite direction on the other track did not affect the case. [Ogden vs. Wilson et al., 243 Pacific Rep., 284.]

NEW JERSEY—*Injury to Alighting Passenger When Car Started without Warning After Unscheduled Stop.*

A car stopped at an unscheduled point because the road was temporarily obstructed by a truck that had been backed up against the curb. Several passengers got off. Then the defendant attempted to do so as it was near her destination, but as she was attempting to alight, the car was started, and she was injured. The question of the motorman's negligence is a proper one for settlement by the jury. [Scott vs. Atlantic City & S. Ry., 132 Atlantic Rep., 239.]

NEW YORK—*Motormen and Conductors May Be Examined by Plaintiff before Trial.*

Within the Civil Practice Act, Sec. 289, which permits the examination of "officers, directors, managing agents, or employees" of a corporation before trial, where their testimony is material and necessary to the plaintiff's case, the motorman and conductor of a street car may be so examined. [Enequist vs. Brooklyn City R., 214 New York Sup., 450.]

SOUTH CAROLINA—*Injury to Taxicab Attempting to Cross in Front of Two Cars*

A taxicab driver received a sign from the motorman of a trolley car on a city street to pass ahead of that car, but when he attempted to do so, he was struck by a trolley car coming in the opposite direction. The taxi driver was held negligent, but a judgment in favor of a passenger in the taxicab was affirmed, as there was some evidence of negligence by the railway. [Dozier vs. Charleston P. R. & L. Co., 131 Southeast. Rep., 592.]

Personal Items

J. P. Griffin Active Vice-President of Texas Road

Important changes are announced in the personnel of the Texas Electric Railway, Dallas, Tex. Burr Martin, vice-president and general manager, has resigned, effective July 1. James P. Griffin has been given the title of active vice-president in charge of all operations.

Mr. Martin's withdrawal is due to slightly impaired health and a desire to retire from active business. He plans an extended trip to the Pacific Coast. Mr. Martin has been with the company more than fifteen years.

Mr. Griffin went to Dallas in July, 1905, with J. F. Strickland as secretary of the Texas Traction Company, an association engaged in the effort to build an interurban railway from Dallas to Sherman. This project was successful, and that line was put in operation on July 1, 1908, and Mr. Griffin served as secretary, also as general passenger agent and auditor. On April 1, 1912, he became also secretary of the Southern Traction Company, then building the interurban lines from Dallas to Waco and Dallas to Corsicana. These lines were put in operation in October, 1913. Mr. Griffin also served as general passenger agent for these lines.

On Jan. 1, 1917, the Texas Traction Company and Southern Traction Company were consolidated under the name of the Texas Electric Railway, and Mr. Griffin was elected secretary and general passenger agent of that company. On June 19, 1923, he was elected vice-president of the Texas Electric Railway.

Mr. Griffin was born at Waxahachie, Tex., on Jan. 28, 1881. He was graduated from the high school at Waxahachie in 1900 and took special work at the University of Texas in 1903. His first railway experience was in the general freight and passenger office at Waxahachie of a subsidiary of the Southern Pacific. He served in the General Land office of the State of Texas at Austin, Tex., from 1902 to 1904, and was secretary to Jack Beall, now president of the Texas Electric Railway, for one year while he was in Congress.

H. I. Gahagan has resigned as treasurer. This vacancy may be filled at the meeting to be held June 15.

A. J. Bush has resigned as local manager at Waco.

J. G. Hailey has resigned as electrical construction engineer, and he will be succeeded on July 1 by G. H. Peters as superintendent of power.

J. A. Wright has resigned as auditor. He will be succeeded by D. W. Milam, Jr.

M. R. Fewell will succeed Mr. Griffin as general passenger agent.

C. F. McAuliff, who is now purchasing agent, will have added the duties of chief clerk in the operating department.

H. G. Floyd will continue as superintendent of the Southern Divisions, Dallas to Waco and Dallas to Corsicana, being in charge of transportation, line and roadway. M. J. Loftus will continue as superintendent in charge of the Dallas-Denison Division, with duties similar to those of Mr. Floyd.

J. F. Layng and J. M. Stoddard on Missouri Road

John F. Layng, vice-president of the Buchanan & Layng Corporation, New York, has assumed the title of general manager for Receiver M. H. McLean of the Joplin & Pittsburg Railway, Joplin, Mo. As announced in the ELECTRIC RAILWAY JOURNAL for April 24, page 738, the Buchanan & Layng Corporation is making a report on the affairs of the railway, with the management of the road placed in the firm's hands. Mr. Layng temporarily assumes the title of general manager for the receiver during the period required to make the report and determine a plan of reorganization. As its resident representative on the ground the engineering firm has appointed J. M. Stoddard to the post of assistant general manager in charge of local operations of the company. Mr. Stoddard was formerly for twelve years superintendent and assistant to the general manager of the Long Island Electric Railway and the New York & Long Island Traction Company, Jamaica, N. Y., and later was general manager of the former company.

F. H. Daniels Heads Riley Stoker Corporation

Fred H. Daniels, general manager of the Riley Stoker Corporation, has been elected president to fill the vacancy resulting from the death of R. Sanford Riley; Aldus C. Higgins, vice-president, has been elected chairman of the board of directors, and James W. Armour, engineering manager, has been elected a member of the board of directors. The officers of the company are now as follows: President, Fred H. Daniels, Worcester, Mass.; vice-presidents, Aldus C. Higgins, Worcester, Mass.; William Pestell, Worcester, Mass.; R. T. Riley, Winnipeg, Manitoba; S. A. Armstrong, Toronto, Ontario; and secretary and treasurer, David K. Beach, Worcester, Mass. The board of directors of the company now consists of Fred H. Daniels, Aldus C. Higgins, William Pestell, David K. Beach, George N. Jeppson, Charles L. Allen, Henry S. Pickands, and James W. Armour.

Since the organization of the company in 1911 Mr. Daniels has been closely associated with Mr. Riley in connection with its affairs, having served respectively as secretary, general manager and vice-president. The company announces that the same policies and principles which have resulted in the company's growth under the leadership of Mr. Riley will be continued.

C. B. Frazer Made Superintendent of Traffic at Houston

Carl B. Frazer was recently appointed superintendent of traffic of the Houston Electric Company, Houston, Tex., succeeding C. A. Brann, who was transferred to the El Paso Electric Company.

Mr. Frazer has had a varied experience in public utility work and has been connected with companies under the executive management of Stone & Webster, Inc., for eight years. His first assignment was with the Columbus Electric & Power Company at Columbus, Ga., where he was a salesman in the commercial department. After serving in that capacity for one year he entered the accounting department of the company. Later he went to Cuba. There he was connected with a light and water company for approximately one year, but returned to the Columbus company as chief clerk. He next was transferred to the home office of Stone & Webster at Boston, Mass. After serving for nine months in the treasurer's office of Stone & Webster, Mr. Frazer went to the Haverhill Gas Light Company at Haverhill, Mass., as assistant treasurer, whence he went to Houston.

F. A. Jordan Promoted at Atlanta

F. A. Jordan, purchasing agent for the Georgia Railway & Power Company, Atlanta, Ga., for the past three years, has been promoted to the position of supervisor for purchases and stores. These two departments, although their work is closely connected, had previously been operated separately.

Mr. Jordan is a veteran of twenty years service with the Georgia Railway & Power Company. He became a member of the street mains department of the Atlanta Gas Light Company in 1907. Later he was transferred to the stores and purchasing department of the same company, and upon the formation of the Georgia Railway & Power Company he was assigned to the purchasing department. He became purchasing agent for the Georgia company in 1923.

Obituary

Eliseur S. Goodrich, president of the Hartford Street Railway and of its predecessor, the Hartford & Wethersfield Horse Railway, Hartford, Conn., for some 40 years prior to 1906, died in Wethersfield, Conn., on June 1. He was 91 years old last December. For many years Mr. Goodrich was also president of the Hartford & New York Transportation Company, which operated a steamboat line between New York and Hartford, but he retired from active connection with both companies upon their purchase by the New York, New Haven & Hartford Railroad. He did not, however, give up his personal interest in electric railroading at that time, and he was a regular attendant of annual conventions of the American Electric Railway Association long after he was 80 years old.

Manufactures and the Markets

News of and for Manufacturers—Market and Trade Conditions
A Department Open to Railways and Manufacturers
for Discussion of Manufacturing and Sales Matters

Business Conditions in May Improve Over 1925

Reports for the early weeks of May indicate increases in business activity as compared with the same weeks of 1925. Larger production of bituminous coal and beehive coke, larger awards for building construction, greater receipts of wheat and cotton, and a larger distribution of merchandise, as measured by car loadings, were reported during this period, compared with the corresponding weeks of 1925. Debits to individual bank accounts, indicative of the dollar volume of trade, were also running larger during the early weeks of May than a year ago. Wholesale prices continued to average lower than a year ago but the early weeks of May recorded an advance over the previous month. Business failures were running smaller in number than a year ago.

Loans and discounts of Federal Reserve member banks were declining in May, as compared with last month, but were well above last year. Prices of stocks averaged for the third week of May were higher than in the preceding week and a year ago. Call-loan rates for the same week were stronger than in any previous week during the month, being higher also than a year ago. Time-money rates showed the same comparison with the previous weeks and a year earlier, while the Federal Reserve ratio, averaged for the first three weeks, was higher than in the previous month but lower than a year ago. Loans on stocks and bonds to brokers and dealers by member banks in New York City continued to decline.

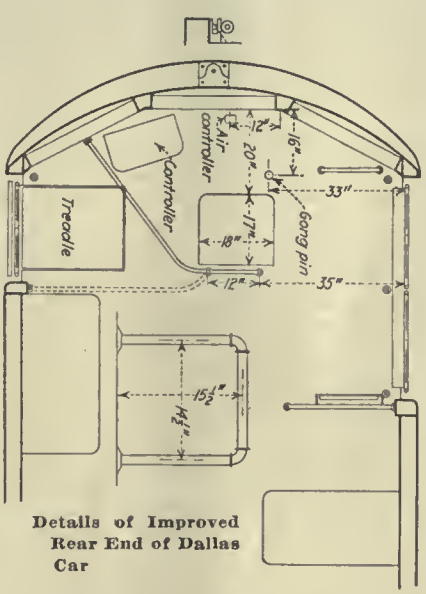
Six-Wheel to Exhibit Buses and Trucks

Exhibition of the new type parlor car body on the model 64 bus chassis will be made by the Safeway Six-Wheel Company of Philadelphia at the forthcoming convention of the Mechanical and Purchases and Stores Division of the American Railway Association at Atlantic City, June 9-16. New departures in the model 64 bus, which is designed either for high-class city or de luxe interurban touring service, are the street car type double jackknife folding front doors, arcade type of roof, permitting low appearance from the outside while allowing 75½ in. of headroom, and rear doors 31 in. on both sides. Five seats of the folding taxi type are installed at the rear. The right-hand rear door for baggage storage opens only to the outside. Balloon tires 38x9 are standard equipment.

In addition to the new bus model, the company has on exhibit its new model 57 truck chassis, suitable for city trucking service and particularly for long-distance operators, it is claimed. The Six-Wheel company believes that railways will become large users of this new truck. It has shown a speed of from 25 to 40 m.p.h. without injury to pay-load or highway, it was stated.

Improved Rear Exits for Dallas Cars

The Dallas Railway, Dallas, Tex., has ordered 30 one-man, two-man modified Peter Witt type cars from the American Car Company, St. Louis, Mo. As a new feature the rear doors of these cars are



Details of Improved Rear End of Dallas Car

to be treadle operated, this being added to speed up unloading and consequently the operating time of the cars.

General specifications are as follows:

Number of cars ordered	30
Name of road	Dallas Railway
Date order was placed	May 8, 1926
Builder of car body	American Car Co., St. Louis, Mo.
Type of car	One-man-two-man
Length over all	45 ft. 8¾ in.
Truck wheelbase	21 ft. 11½ in.
Width over posts	8 ft. 5 in.
Height, rail to trolley base	10 ft. 7½ in.
Body	All steel
Interior trim	Cherry, stained light
Roof	Arch
Air brakes	General Electric
Bumpers	Channels with flanges outward
Car signal system	Faraday buzzers
Car trimmings	Statuary bronze
Curtain fixtures	Curtain Supply
Curtain material	Curtain Supply, Wyndasote
Destination signs	Hunter No. 35
Door operating mechanism	National Pneumatic—rear doors treadle operated
Fare boxes	Johnson
Fenders	H. B. lifeguard
Heater equipment	Consolidated Car Heating double coil trussplank
Headlights	Golden Glow SM-95
Motors	Four GE-265, inside hung
Sanders	Nichols-Lintern materials preferred
Sash	Curtain Supply all metal
Seats	Reversible backs
Seating material	Birch slats
Step treads	Feralun
Trolley catchers	Keystone
Trucks	Brill 177-E-1
Ventilators	Railway Utility honeycomb
Wheels	26 in. diameter
Energy saving device	Economy meters

Need for Relief from Unwise Transportation Legislation Stressed

Using the illustration of over-regulation of traffic and all forms of transportation by national, state and municipal governments to show the need for industrial freedom from unwise legislation, Frederick P. Fish, honorary chairman of the National Industrial Conference Board, pointed out the manner in which the board has striven to overcome this tendency during its past ten years of existence. His talk was given on the occasion of the tenth anniversary meeting of the board, held at the Hotel Astor, New York, on May 20. Mr. Fish was one of the original founders of the conference board and has acted as its chairman up to the present time. The address was in the nature of a review of the manner in which the board has functioned and the objective to which it has striven during its existence.

While stressing the point that industry as a whole and the transportation industry in particular must expect a certain amount of legislative control of the proper kind and must, in fact, welcome this supervision as conducive to its own best interest, nevertheless too great control or legislation which does not consider the welfare of the public as a whole and provide fair treatment to its transportation agencies must be discouraged. Mr. Fish pointed out that the present traffic situation is intolerable in the larger cities of the country and that conditions will inevitably become worse before some means of betterment is found. In this connection, he believes that the proper interpretation of all facts dealing with transportation in general is of utmost importance and should be stimulated by railway and other transportation officials.

Today industry is far less individualistic, according to Mr. Fish, and the relationships existing between employer and employee have undergone a profound change from those of a few years ago. Employers have come to realize that they do not profit in the long run by refusing to their employees a comfortable living wage. Mr. Fish stated that the labor unions are valuable institutions as long as their function is to remain on watch against unfair treatment of labor, unsatisfactory working conditions, etc. In this function, he

Metal, Coal and Material Prices

Metals—New York	June 1, 1926
Copper, electrolytic, cents per lb	13.825
Copper wire, cents per lb	16.00
Lead, cents per lb	7.675
Zinc, cents per lb	7.30
Tin, Straits, cents per lb	60.25
Bituminous Coal f.o.b. Mines	
Smokeless mine run, f.o.b. vessel, Hampton Roads, gross tons	$4.675
Somerset mine run, Boston, net tons	2.00
Pittsburgh mine run, Pittsburgh, net tons	1.825
Franklin, Ill., screenings, Chicago, net tons	1.925
Central, Ill., screenings, Chicago, net tons	1.75
Kansas screenings, Kansas City, net tons	2.50
Materials	
Rubber-covered wire, N. Y., No. 14, per 1,000 ft	$6.25
Weatherproof wire base, N. Y., cents per lb	18.00
Cement, Chicago net prices, without bags	2.10
Linseed oil (5-bbl. lots), N. Y., cents per lb.	11.20
White lead in oil (100-lb. keg), N. Y., cents per lb	15.00
Turpentine (bbl. lots), N. Y., per gal	$0.87

believes that they are to be heartily cooperated with, but when they attempt to interfere with management, to restrain production and to endanger public welfare, Mr. Fish believes they should be strongly condemned.

The speaker suggested a comprehensive survey by some unprejudiced body or commission, examining into the very root and structure of industry throughout the country. In this way, with all sides playing fair, he believes that it will be possible to determine just what regulation is needed today. This study of industry should be made in the light of present conditions rather than those of 40 or 50 years ago, and the study should embrace not only business in general but transportation services as well. The speaker declared that the state legislatures and national government are recognizing the changed attitude which industry is taking in its relations with the public, the government and its employees, as well as its competitors. He pointed out that in former days the railroads and industry invited legislative attacks by the general attitude which they assumed. The attack was not slow in forthcoming and much damage was done to the general business structure before the uncompromising attitude which had caused the trouble was done away with.

The danger of a highly organized minority dominating an entire community was pointed out in connection with a reference to the recent coal strike and the often-threatened general railroad strike in this country. The experience which England has just gone through was cited to show that it is the duty of the American people to look forward and see what can be done to make impossible any such situation in this country.

Westinghouse Traction Appointments

T. J. Pace, director of sales for the Westinghouse Electric & Manufacturing Company, East Pittsburgh; Pa., has announced the following appointments in the traction apparatus sales division of the company. In charge of the division is A. J. Manson, while in charge of the various types of traction sales are E. T. Wurts, heavy traction; E. A. Palmer, light traction; W. B. Bassett, propulsion; L. F. Brahmer, line material; A. B. Gibson, renewal parts, and E. P. Gooth cost.

Rolling Stock

Birmingham Electric Company, Birmingham, Ala., is following, in its sixteen new cars, very much the design of the previous order. The principal differences are that the new cars will have rubber tile floors, metal sash and plush upholstered seats. A brief reference to this latest order was published in the issue of May 22, page 910. Some of the principal specifications follow:

Date order was placed	May 20, 1926
Date of delivery	Four months
Builder of car body	Cincinnati Car Company
Type of car	Closed passenger motor
Seating capacity	60
Weight (total)	35,000 lb.
Length over bumpers	49 ft. 7 in.
Length of body	48 ft. 7 in.
Width over all	8 ft.
Height, rail to trolley base	10 ft. 8½ in.
Body	Side entrance
Interior trim	Cherry
Roof	Turtle back type
Air brakes	Westinghouse straight air
Axles	Treated steel
Bumpers	Cincinnati Car Company pressed steel
Buzzers	Electric Service Supplies Company
Car trimmings	Brass
Conduits	Duraduct
Control	K
Curtain fixtures	Curtain Supply Company
Curtain material	Pantasote
Destination signs	Hunter
Door-operating mechanism	National Pneumatic
Fenders	H. B. Ilfeguards
Gears and pinions	G. E., treated
Hand brakes	Cincinnati Car Company
Heaters	Consolidated
Headlights	Electric Service Supplies Company
Headlining	Agasote
Journal boxes	Cincinnati Car Company
Lightning arresters	G. E.
Motors	G. E. 265
Paint	Duco
Registers	International
Sanders	Ohio Brass
Sash fixtures	National Lock Washer
Seats	Hale & Kilburn
Seating material	Plush
Side and center bearings	Cincinnati
Slack adjusters	American
Springs	Cincinnati Car Company
Step treads	Feralun
Trolley catchers	Ohio Brass
Trolley base	U. S. 20-C
Trucks	Arch bar, Cincinnati
Ventilators	Railway Utility Company
Wheels	Chilled iron, 26-in. diameter

Track and Line

Gary Railways, Gary, Ind., has started the reconstruction of a substantial part of the 15-mile interurban line between Gary and Valparaiso, Ind. The program calls for expenditures of approximately $37,000. It includes the rebuilding of the Woodville Junction bridge and several small trestles, the erection of five new outdoor passenger shelters and the laying of 10,000 creosote-treated ties. The work of laying a second track on Eleventh Street in Gary will soon be undertaken. Double tracking of a section ¾ mile long through Tolleston on the Gary-Hammond line was completed on May 28. In all reconstruction, the company is replacing the old 60-lb. rails with 90-lb. rails, installing creosote-treated ties and laying heavy gravel ballast.

Trade Notes

Edwin Besuden, for the past few months sales promotion manager for the Leon L. Wolfe Company, Cincinnati, Ohio, has severed his connections with that company. Most of Mr. Besuden's experience has been in the electric railway field. For more than eighteen years he was affiliated with the Jewett Car Company, Newark, Ohio, being sales manager twelve years of that time. Upon the retirement of this company from business he became associated with the Chicago Varnish Company as sales manager of its eastern territory, later acting in a similar capacity for the DuPont company after its purchase of the Chicago Varnish Company. While with the Leon L. Wolfe Company Mr. Besuden introduced Kemi-Suede, the new waterproof fabric manufactured by the Kemitex Products Company, Barberton, Ohio.

Taylor Electric Truck Company, Troy, N. Y., manufacturer of electric railway car trucks, railway car springs and springs for heavy vehicles, announces the appointment of L. W. Rolfe as sales manager. Mr. Rolfe formerly served in the same capacity with the Simmonds Machine Company of Albany, N. Y.

Francis A. Fox, formerly of the Griffin Wheel Company and more lately of the Yellow Truck & Coach Manufacturing Company, has joined the organization of the Mack-International Motor Truck Corporation, with headquarters in Chicago. Mr. Fox will co-operate with the various branches of the central division of this company in the sale of buses and trucks to the public utility and railway companies. The central division comprises eighteen states in the Middle West.

Francis T. West, who has been Western manager of the Watson-Stillman Company, with headquarters in Chicago, Ill., for the past 25 years, has retired. He has been succeeded by J. F. Coyne with offices at 549 West Washington Boulevard, Chicago. Associated with Mr. Coyne in the handling of the hydraulic machinery and accessory lines of the Watson-Stillman Company are James T. Lee and John O. Clark.

Bridgeport Brass Company, Bridgeport, Conn. has announced that H. Allen Faust, 915 City Center Building, Philadelphia, who has been covering the state of Pennsylvania, including the Philadelphia district and southern New Jersey, as salesman of brass pipe and tubular plumbing goods, has had Maryland, West Virginia and Washington, D. C., added to his territory.

Dr. R. H. Cunningham, widely known electrical engineer, has joined the Eisemann Magneto Corporation engineering staff. Dr. Cunningham has been identified with the automotive industry since its inception, except for a brief period 1917-1919, during which he occupied a post at Columbia University.

New Advertising Literature

American Car & Foundry Motors Company, New York, N. Y., has issued a leaflet entitled "Across the United States Every Eighteen Minutes." It describes the large mileage and world-wide adoption of Fageol safety coaches, and the manner in which these buses are being developed in line with best transportation practice and thought.

American Abrasive Metals Company, New York, N. Y., has just issued a new leaflet illustrating and describing a new design of safety car step. The use of Feralun anti-slip treads in connection with various step designs pictured is recommended by the company.

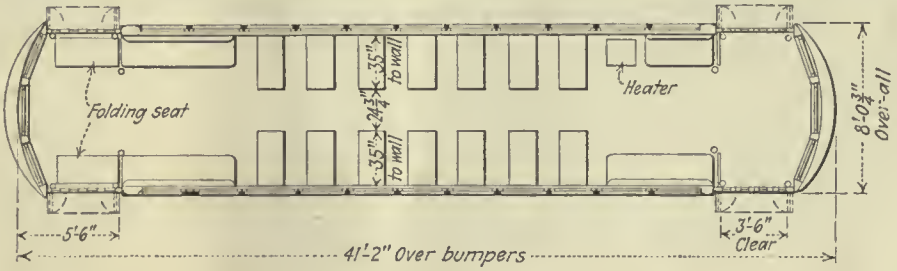
Economy Electric Devices Company, Chicago, Ill., has issued a leaflet telling of the purchase of 375 Economy watt-hour meters by the Philadelphia Rural Transit Company, Philadelphia, Pa. An extract from a paper by R. M. Horton president of the Philadelphia Rural Transit Company, which was delivered before the Society of Automotive Engineers in November, 1925, is included.

Roller-Smith Company, New York, N. Y., has issued supplement to Bulletin No. 530 dated May, 1926, covering Roller-Smith direct-acting time-limit attachments for standard type circuit breakers.

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"We felt that you would be interested in knowing of the very good service Firestone Tires have been giving us and the exceptional way your local dealer takes care of our needs.

"We very highly recommend Firestone Gum-Dipped Cords to any bus operator interested in low tire cost per mile."

The endorsement of another Firestone enthusiast! For Firestone Bus Pneumatics permit maintenance of schedules at lowest cost per mile. They are built specially for bus loads at bus speeds. They deliver the mileage that means economy.

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MOST MILES PER DOLLAR

The Mark of Quality

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AMERICANS SHOULD PRODUCE THEIR OWN RUBBER . Harvey S. Firestone

Light on the Bus Braking Question

The A B C's of Bus Brakes and Braking Systems

Self-Equalization and Brake Adjustments

For safe, effective braking it is absolutely necessary that wheels on the same axle receive equal braking power. On front wheels this is vital. A stronger drag on one side than on the other may easily spell disaster.

Perfect brake equalization depends primarily upon three major elements:—Friction between tires and road surface;—coefficient of friction between the brake shoes or bands and the drums;—and the pressure applied to the band or shoe.

The first of these is governed by tire pressures and actual road surface conditions, and is largely under control of the operator.

The equalization of the coefficient of friction between two or more sets of brakes has been difficult to obtain and maintain. The latest modern practices in the manufacture and application of brake linings and drums have, however, developed these parts to the point where we can depend upon a fairly constant coefficient of friction. It is reasonable, therefore, to consider this factor disposed of.

The third and by far most important element is the pressure applied to the bands or shoes—*THIS PRESSURE MUST BE EQUAL under all conditions.*

Equal pressure against the shoes or bands has never been obtained and *MAINTAINED* by any manual or power system that is complicated by levers, pull rods, universals, shafts and cams. Although difficult, brakes *can* be equalized in the shop by a mechanic, but lost motion, wear and vibration soon undo this work. Only a system that is AUTOMATICALLY SELF-EQUALIZING can be depended upon to stay equalized; and further, such a system must automatically equalize the pressure applied to the bands, regardless of the amount of wear upon the bands, and regardless of other variable factors.

Obviously a system which will maintain this automatic equalization must be simple in construction, and direct in action, with the minimum of moving parts between the actuating mechanism and the brake band. Likewise its power must be transmitted by a fluid—i.e., air, oil or a similar agent. The pressure in a fluid system is equal throughout, and when directly applied, the ideal of AUTOMATIC SELF-EQUALIZATION is attained. In no other way is this possible.

The brake system that automatically maintains equal braking pressure at the point of application will also be completely free from brake adjustment. If there is sufficient movement in the mechanism to take up all wear of the liner and "follow-up" of the drum the brakes will need no adjustments from the time a set of liners is put in until it is completely worn out.

The result of such a system will be safe, effective braking at all times; and entire relief from the expense and delays incidental to frequent brake inspection and adjustment.

This is the third of an informative series on Bus brakes. The series consists of:

A—What Brakes Must Do.
B—How many wheels should brakes go on?
C—Self-equalization and brake adjustments.
D—Curing the skid.
E—Metal to metal or molded linings—which?
F—Braking Power.
G—Compressor Mountings and Drives.
H—Compressor Cooling.
I—The Control Valve.
J—Maintenance on Different Types.

The other topics will appear in the above order. Address any comments, suggestions, or requests for advance information to—

The Christensen Air Brake Co.
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Over 40,000 buses have followed the Budd-Michelin road of experience

BEFORE the bus industry started the Budd-Michelin Dual Wheel was making history.

It had battled war-torn roads where no other wheel could stand the punishment—and triumphed!

The bus industry saw its advantages. Here was a wheel that made it possible for heavy buses to ride on pneumatics. It meant the economy of interchangeable wheels and tires—and one wheel-service for the fleet.

Today over 40,000 heavy buses are rolling up from 15,000 to 20,000 profitable miles from a set of tires on Budd-Michelin Dual Wheels. The road that's paved with such experience is a safe road to follow.



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WHEEL COMPANY
Detroit

The Budd-Michelin equipment—two Budd-Michelin single wheels in front, two Budd-Michelin Dual Wheels in the rear (pairs of single wheels acting together as units.) All wheels completely interchangeable either as units or as halves of Duals. One spare.





The Passenger's View

Nothing contributes more to the selling of service by motor coaches than comfort and a feeling of real security.

Graham Brothers Coaches appeal to the rider because they are built from the *passengers'* viewpoint. It is they who appreciate the handsome low body, the riding comfort obtained by the well upholstered and amply spaced seats, the wide aisle and proven safety as the driver easily winds in and out of traffic. They know that the Dodge Brothers Engine can be relied upon to perform under the very trying conditions of every-day bus operation.

These are the qualities that will attract the rider.

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"Body—

the principal part of anything"—*Webster*

CONSULT Noah Webster and other dictionary compilers, and that's what they will tell you. It's worth heeding when you buy a bus.

A husky motor, long-lived tires, and reliable drivers are assets, of course, but the One Biggest Question in the *public mind,* in the minds of your prospective passengers, is *"Are the busses convenient and comfortable?"* That's what will attract them your way, teach them the bus-riding habit and coax them away from other forms of public transportation and from their own automobiles.

Leg-room, elbow-room, head-room, luggage-space, freedom from jounce, free vision, easy access to seats, freedom from squeaks, interior conveniences and refinements—these are the factors which make all the difference between a half-empty coach and a full-up pay-load. These are the points which inspire favorable comment—the finest kind of advertising for you—and make people anxious to try a ride with you.

Because its study of bus transportation has convinced The Baker-Raulang Company that the greatest single need of the Bus Industry is the elimination of awkward, inconvenient and uncomfortable vehicles from the streets and highways, and making it possible for the operator to carry the greatest possible number of comfortably-seated passengers for a given length of wheelbase, The Baker-Raulang Company has set up as the motto of its Bus Body Department—*"To promote public popularity."*

In every type of body it designs the goal will be to improve upon existing standards of the industry and develop a body which will definitely and measurably attract trade and win public favor.

We are already prepared to explain by letter several accomplishments new to bus body designing which have emphatically passed the all-important test of outspoken public approval.

THE BAKER-RAULANG COMPANY · *Raulang Bus Body Division* · CLEVELAND, OHIO

Baker Raulang BUS BODIES

To Promote Public Popularity

The Beautiful Coaches of INTERNATIONAL HARVESTER *Manufacture Lend Distinction to the Proudest Highways*

THE success of the International Harvester Company in motor coach development is founded on the firm foundation of over twenty years' automotive experience.

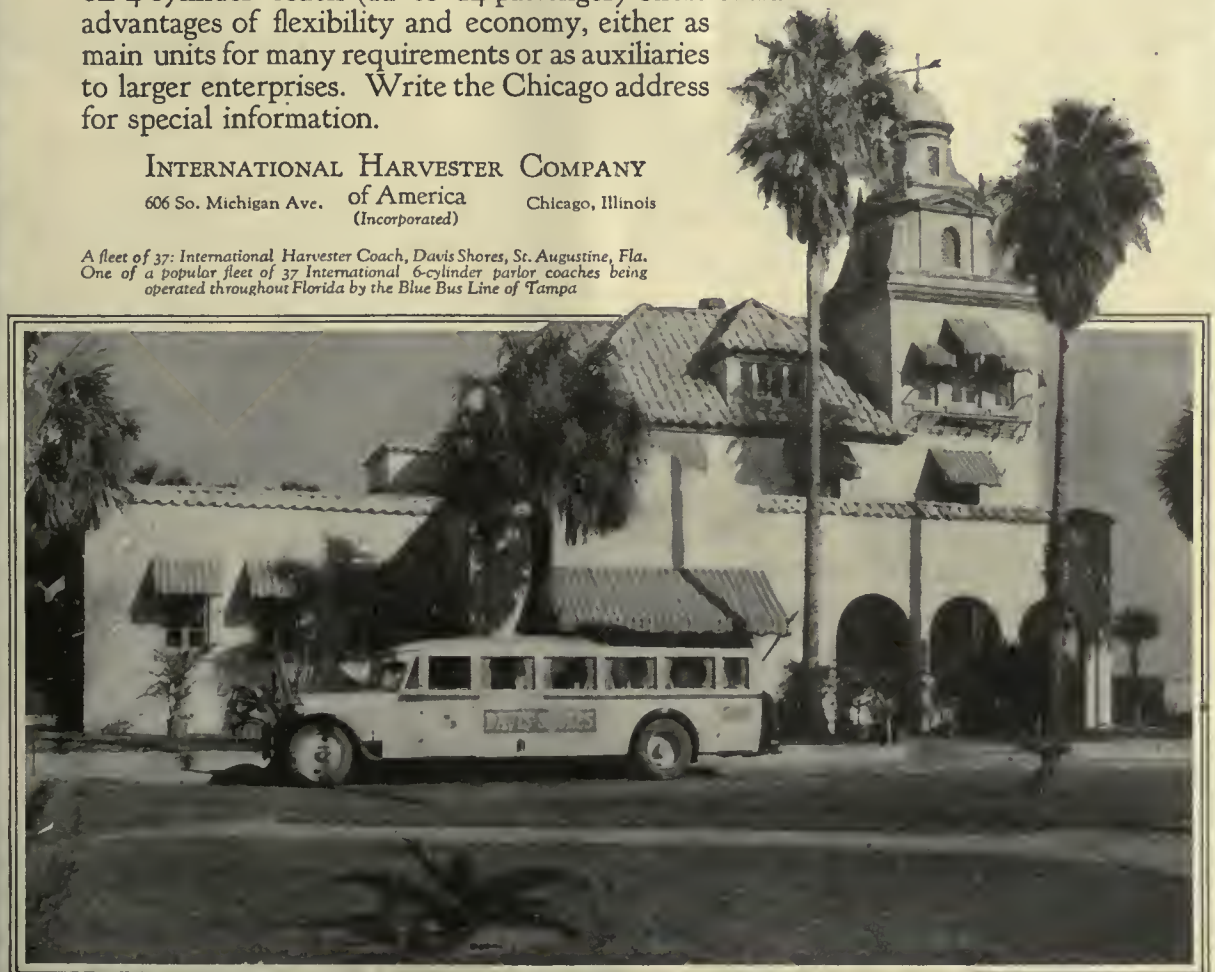
Merit in design and mechanical detail, beauty of line, and perfection of body appointment have built a consistent high reputation for International Motor Coaches and called them to service on good and bad roadways the nation over.

The various bodies supplied for the 6-cylinder chassis carry 24 to 33 passengers. Regular equipment includes air brakes on all four wheels. The International SL 4-cylinder coach (12 to 14-passenger) offers extra advantages of flexibility and economy, either as main units for many requirements or as auxiliaries to larger enterprises. Write the Chicago address for special information.

INTERNATIONAL offers unparalleled service to coach owners, rendered through the *world's largest Company-owned truck and coach service organization.* Company-owned branches now at 120 points in the United States and 17 in Canada, supplemented by the service of our automotive dealers.

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One way to keep your cars on the road

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Nitro-Valspar keeps its good looks. Long after ordinary finishes are shabby and dull, Nitro-Valspar shines like new. Its durability is amazing.

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A large section of a steel car finished with Nitro-Valspar is on exhibition at the Valentine booth, number 57, at the Railway Car Accessory Manufacturers Exhibition, Young's Pier, Atlantic City, June 9-16th. Come and see it. You'll find a finish there worth investigating.



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Essential to Progress

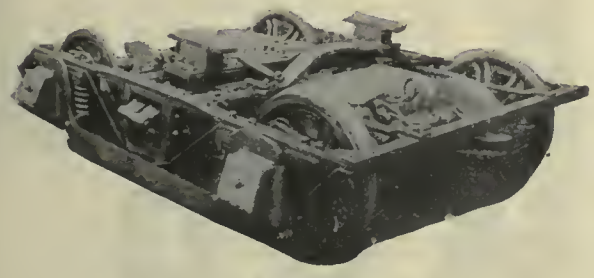
Today's conditions require better equipment — light weight, better operating characteristics, and more attractive appearance—in other words *modern cars.*

Let our engineers help you develop equipment for your modernization program.

We will gladly offer designs and estimates, or quote on your plans and specifications.



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Type MC-62 Light Weight Low Car Body Truck for City and Interurban Service

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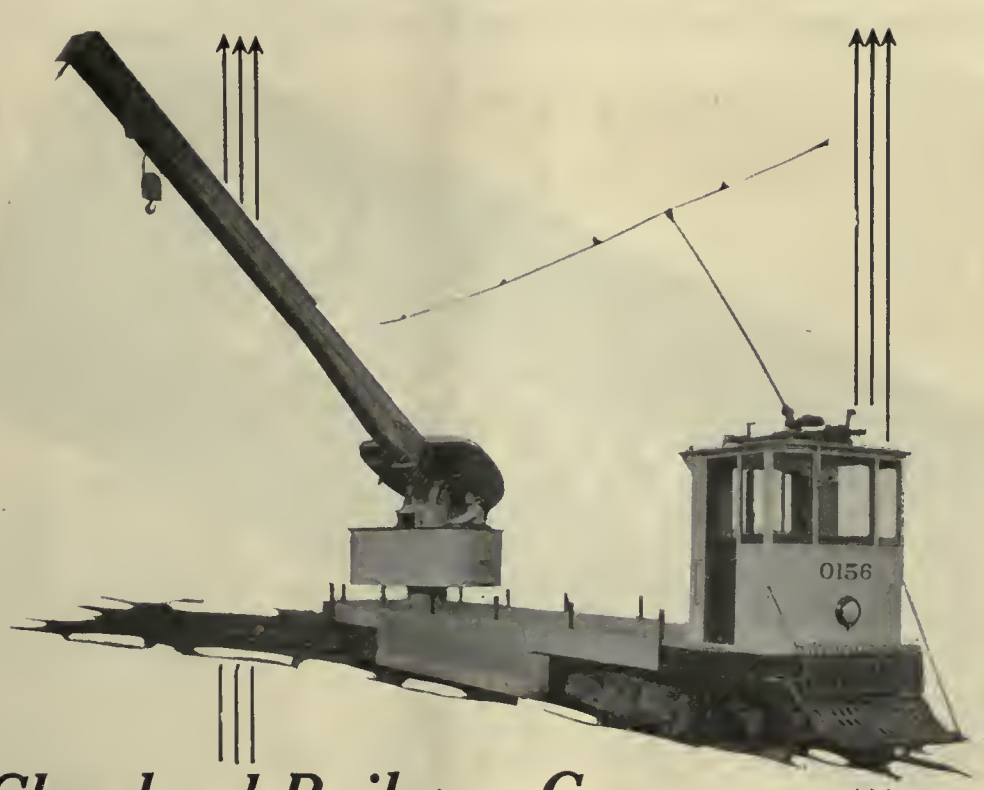


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Built for rugged service, this Differential Crane Car depends on "STANDARD" Rolled Steel Wheels to help maintain its record of performance.

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THE experience of leading street railway companies throughout America with their overhead construction points to less interruption to service, lower upkeep, greater reliability and longer life of the installation when these poles are used. There is another advantage of tubular poles—their straightness and general uniformity give a neat appearance to the street wherever used.

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The use of Stud Terminal Rail Bonds, exclusively by the New York, New Haven and Hartford Railroad clearly indicates that this type of bond has stood the test of time.

No bond has more convincingly demonstrated its efficiency and ease of maintenance on lines carrying heavy traffic.

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UNITED STATES STEEL PRODUCTS COMPANY, San Francisco, Los Angeles, Portland, Seattle

Douglas Fir—America's Permanent Lumber Supply



Cress, Seattle

An unusual picture

Out in the Douglas Fir country on the West Coast, a photographer who makes a specialty of forest pictures found he could not bring to his pictures a conception of the true size of the Douglas Fir.

With real ingenuity he used two negatives and created this composite picture which compares the mighty Douglas Fir with ten-story office buildings.

One of these trees would build a five-room home.

THE DENSEST and heaviest forests the world has ever known stand today between the west slope of the Cascade Mountains and the waters of the Pacific.

This forest region contains 26 million acres of towering trees — more than 700 billion feet of merchantable timber—three-quarters of which is Douglas Fir; the rest Sitka Spruce, Western Hemlock and Western Red Cedar.

The average yield of these forests is in excess of 30,000 feet per acre and in some cases 150,000 feet and more. One Douglas Fir tree here sometimes produces more lumber than five acres in other forest regions.

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Where timber has been cut and fires guarded against countless millions of young Douglas Fir trees from Nature's own seeding appear, and in their vigorous growth offer a new merchantable supply of the finest quality within a comparatively few years.

Emphasizing the importance of Douglas Fir, we quote from U. S. Forest Service Bulletin 88:

"Douglas Fir may, perhaps, be considered the most important of American woods . . . its rapid growth in the Pacific Northwest forests, its comparatively wide distribution, and the great variety of uses to which it can be put place it first . . . As a structural timber it is not surpassed."

[An illustrated treatise on Douglas Fir, written by a forester, telling why this is the wood of tomorrow as well as today, and how to use it, sent on request]

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5562-T STUART BUILDING, SEATTLE, U. S. A.

Durable
Douglas Fir
AMERICA'S PERMANENT LUMBER SUPPLY

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$296,000,000 will be spent this year for new equipment, material and supplies—Can your salesmen afford to make one false step on his introduction?

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5—Mileage of track and bus routes.

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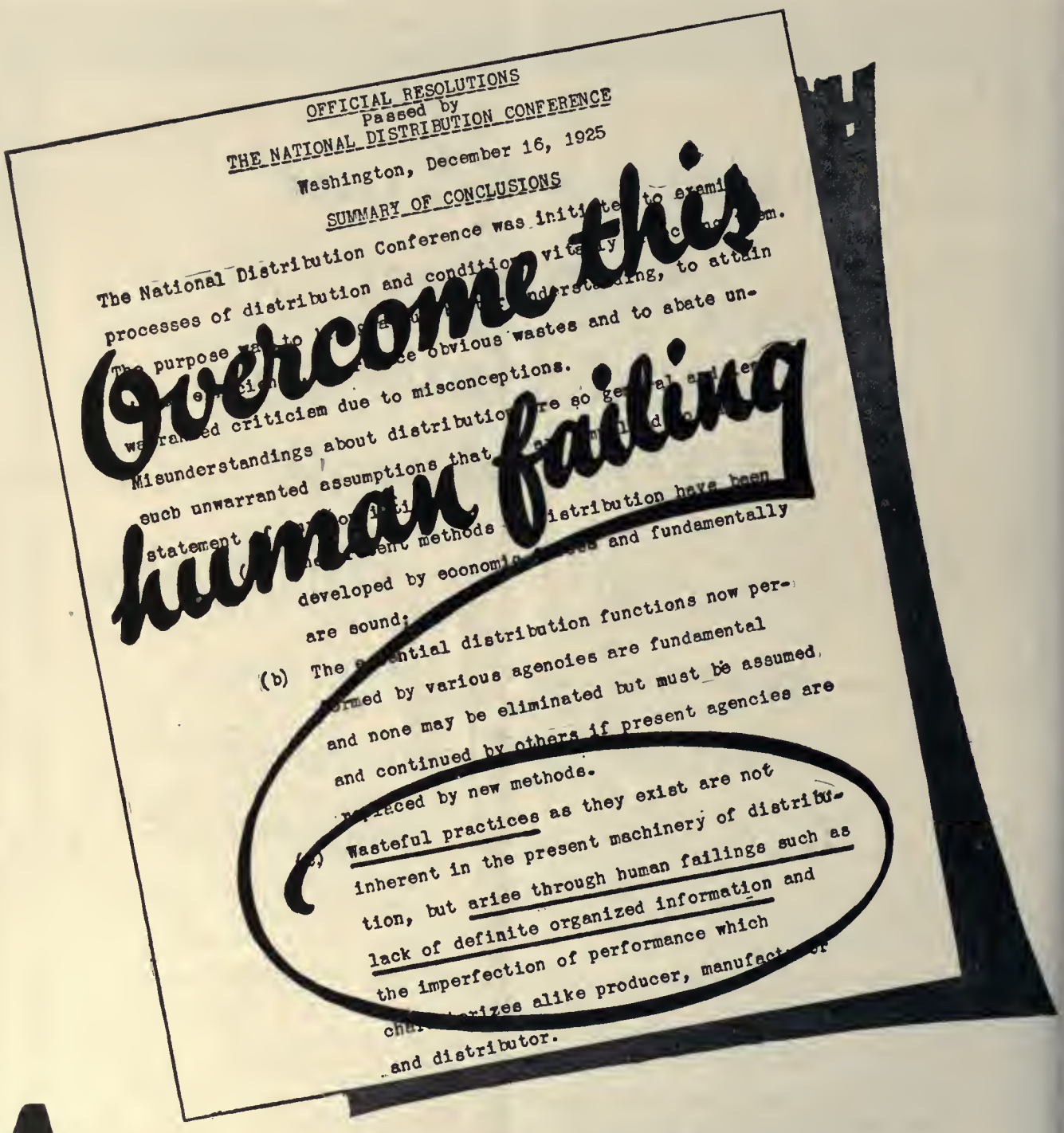
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Company .....

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E.R.J. 6-5-26



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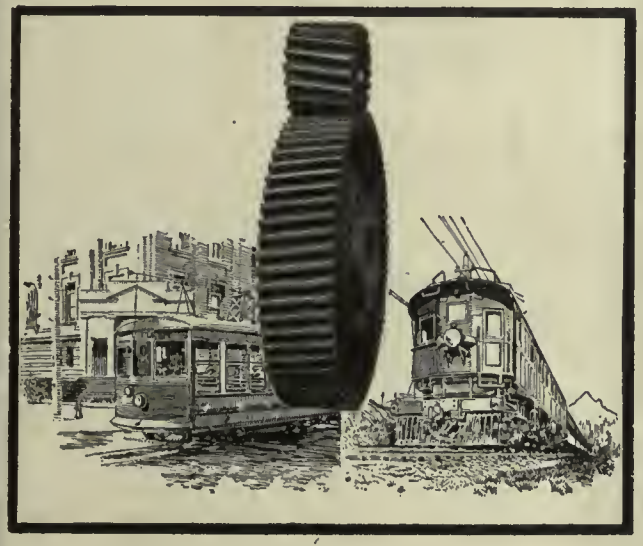
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The answer to the modernization problem in gearing is—Nuttall Helical Gears on all your cars. Their smooth, silent operation, at any speed, means better operating conditions all round.

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The Modern "Gunga Din"

Curse Him if You will--

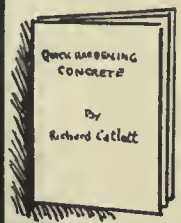
but you've got to have him. And you've got to adapt your methods to his limited experience and undeveloped understanding.

If he's running your concrete mixer, and you need quick hardening concrete--you'll save mistakes and win Tony's everlasting gratitude by giving him CAL.



CAL is easy to store, easy to handle, easy to measure by volume, easy to add at the mixer right along with the cement and aggregates.

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Not if you use

AJAX
BABBITT *for* ARMATURES

keeps the rolling stock rolling



The Ajax Metal Company
Established 1880
PHILADELPHIA
NEW YORK CHICAGO BOSTON CLEVELAND

Greater Service Per Dollar Invested



"Tiger" Bronze Axle and Armature Bearings

More-Jones "Tiger" Bronze castings for axle and armature-bearing service was one of our early achievements. This is probably the most widely known bronze on the market. It has stood the test of time. There is nothing better for long, efficient and most economical results. Let us quote you.

More-Jones Brass & Metal Co.
St. Louis, Mo.

MORE-JONES QUALITY PRODUCTS

Griffin Wheel Company

410 North Michigan Ave.
Chicago, Ill.

GRIFFIN F. C. S. WHEELS

For Street and Interurban Railways

FOUNDRIES:

Chicago	Boston	St. Paul
Detroit	Kansas City	Los Angeles
Denver	Council Bluffs	Tacoma



DIXON PAINT

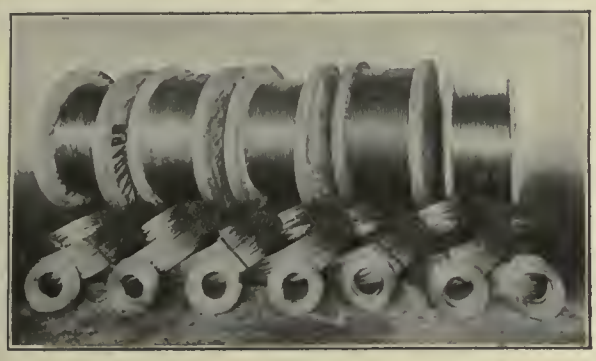
RED LEAD-GRAPHITE PRIMER
ALUMINUM-GRAPHITE
SILICA-GRAPHITE

Consider the high cost or repainting and use one of Dixon's Paints. They will give better protection for exposed metal or wood work at lowest cost and meet the requirements of all specifications.

The pigment, flake silica-graphite, provides a tough yet elastic film that expands and contracts with the heat and cold without cracking or peeling. The graphite and silica are naturally and not artificially combined, resulting in long life, efficient surface protection, elasticity and resistance to dampness.

Write for Booklet 180-B. "Protective Paint"

JOSEPH DIXON CRUCIBLE CO.
JERSEY CITY, N. J. *Established 1827*



STANDARD
Copper and Bronze Wires
for Trolley and Transmission Service

are rolled and drawn in our own mills and carefully inspected at every step in the process. They meet every requirement of the most difficult operating conditions.

If you are interested in high quality wire at an economical price, write our nearest office.

Standard Underground Cable Co.

BOSTON PHILADELPHIA PITTSBURGH CHICAGO
NEW YORK WASHINGTON DETROIT ST. LOUIS
SAN FRANCISCO

FOR CANADA: STANDARD UNDERGROUND CABLE CO. OF CANADA, LIMITED, HAMILTON, ONT.

PANTASOTE
Trade Mark
Seat and Curtain Materials
There is no substitute for Pantasote

AGASOTE
Trade Mark
Roofing—Headlining—Wainscoting
The only homogeneous panel board

standard
for electric railway cars
and motor buses



82% use "Tool Steel" gears.

The A. E. R. A. Equipment Committee—1924-1925

THE 1924-1925 A. E. R. A. Equipment Committee consisted of 14 railway men representing many of the large and aggressive companies. Their companies controlled a total of 16,992 cars. The line-up regarding their use of "Tool Steel" gears is as follows:

Exclusive Users—6 companies controlling 8003 cars.....47%	82%
Part Users—5 companies controlling 5971 cars.....35%	
Companies Testing—1 company controlling 1435 cars.....9%	
Non-Users—2 companies controlling 1583 cars.....9%	

Remember, the companies in this tabulation were selected by the A. E. R. A. as the live wires on equipment. They certainly know quality when it comes to gears.

The Tool Steel Gear & Pinion Co.,
Cincinnati, Ohio





R 11 Double Register

Both our latest single and double registers are now equipped for electric as well as mechanical hand or foot operation.

Full Electric Operation of Fare Registers

A completely satisfactory fare registration system is one that has the confidence of the public, the conductor and the accounting department. The simplicity and accuracy of International Registers maintained for more than thirty years, is combined in the later types with the extra speed and convenience of electric operation.

The International Register Co.
15 South Throop St., Chicago



Complete satisfaction

Operating perfectly and requiring minimum attention for maintenance and lubrication, Earll Catchers and Retrievers give genuinely satisfactory results. Their refinement of design, and mechanical superiority are summarized in the following five features, peculiar to Earll construction.

No-wear Check Pawl
Free-Winding Tension Spring
Ratchet Wind
Emergency Release
Perfect Automatic Lubrication

Earll Catchers and Retrievers

C. I. EARLL, York, Pa.

Canadian Agents:
Railway & Power Engineering Corp., Ltd., Toronto, Ont.
In All Other Foreign Countries:
International General Electric Co., Schenectady, N. Y.

PERFECT
MICANITE
INSULATOR
Reg. U. S. Pat. Off.

ELECTRICAL INSULATION

Micanite armature and commutator insulation, commutator segments and rings, plate, tubes, etc., Empire oiled insulating materials; Linotape; Kablak; Mico; and other products—for the electrical insulating requirements of the railway.

Catalogs will gladly be furnished

MICA INSULATOR COMPANY
Sole Manufacturers of Micanite
Established 1893
68 Church St., New York 542 So. Dearborn St., Chicago
Works: Schenectady, N. Y.
8-F

You're having brush trouble

CORRECT IT
USE LE CARBONE CARBON BRUSHES

They talk for themselves

COST MORE PER BRUSH
COST LESS PER CAR MILE

W. J. Jeandron
Hoboken Factory Terminal,
Building F, Fifteenth Street, Hoboken, N. J.
Pittsburgh Office: 634 Wabash Bldg.
Chicago Office: 1657 Monadnock Block
San Francisco Office: 525 Market Street
Canadian Distributors: Lyman Tube & Supply Co., Ltd., Montreal and Toronto

Kalamazoo Trolley Wheels

The value of Kalamazoo Trolley Wheels and Harps has been demonstrated by large and small electric railway systems for a period of thirty years. Being exclusive manufacturers, with no other lines to maintain, it is through the high quality of our product that we merit the large patronage we now enjoy. With the assurance that you pay no premium for quality we will appreciate your inquiries.



THE STAR BRASS WORKS
KALAMAZOO, MICH., U. S. A.

The Hardware makes the line
Hubbard makes the Hardware

HUBBARD

Hubbard and COMPANY
PITTSBURGH · OAKLAND, CAL. · CHICAGO

THE BABCOCK & WILCOX COMPANY

85 LIBERTY STREET, NEW YORK

Builders since 1868 of Water Tube Boilers of continuing reliability

BRANCH OFFICES

BOSTON, 49 Federal Street
PHILADELPHIA, Packard Building
PITTSBURGH, Farmers Deposit Bank Building
CLEVELAND, Guardian Building
CHICAGO, Marquette Building
CINCINNATI, Traction Building
ATLANTA, Candler Building
PHOENIX, ARIZ., Heard Building
DALLAS, TEX., 2001 Magnolia Building
HONOLULU, H. T., Castle & Cooke Building
PORTLAND, ORE., 805 Gasco Building

WORKS
Bayonne, N. J.
Barberton, Ohio

Makers of Steam Superheaters since 1898 and of Chain Grate Stokers since 1893

BRANCH OFFICES

DETROIT, Ford Building
NEW ORLEANS, 344 Camp Street
HOUSTON, TEXAS, 1011-13 Electric Building
DENVER, 435 Seventeenth Street
SALT LAKE CITY, 405-6 Kearns Building
SAN FRANCISCO, Sheldon Building
LOS ANGELES, 404-6 Central Building
SEATTLE, L. C. Smith Building
HAVANA, CUBA, Calle de Aguiar 104
SAN JUAN, Porto Rico, Royal Bank Building

The DIFFERENTIAL CAR



Standard on 60 Railways for

Track Maintenance
Track Construction
Ash Disposal
Coal Hauling
Concrete Materials
Waste Handling
Excavated Materials
Hauling Cross Ties
Snow Disposal

Use These Labor Savers

Differential Crane Car
Clark Concrete Breaker
Differential Bottom Dump Ballast Car
Differential Car Wheel Truck and Tractor

THE DIFFERENTIAL STEEL CAR CO., Findlay, O.

Bethlehem Products for Electric Railways

Tee and Girder Rails; Machine Fitted Joints; Splice Bars; Hard Center Frogs; Hard Center Mates; Rolled Alloy Steel Crossings; Abbott and Center Rib Base Plates; Rolled Steel Wheels and Forged Axles; Tie Rods; Bolts; Tie Plates and Pole Line Material.

Catalog Sent on Request

BETHLEHEM STEEL COMPANY, Bethlehem, Pa.

BETHLEHEM

Wharton Special Trackwork

Trackwork of superior quality, incorporating the famous Tisco Manganese Steel.

WM. WHARTON JR. & CO., Inc.
EASTON, PA.

OFFICES:

Boston Chicago El Paso Montreal New York
Philadelphia Pittsburgh San Francisco Scranton

SPECIALISTS

in the

Design and Manufacture

of

Standard—Insulated—and Compromise Rail Joints

The Rail Joint Company
165 Broadway, New York City

BUDA

ESTABLISHED 1881

Special Track Work of every description

THE BUDA COMPANY
Harvey (Suburb Chicago) Illinois

Lorain Special Trackwork Girder Rails

Electrically Welded Joints

THE LORAIN STEEL COMPANY
Johnstown, Pa.

Sales Offices:

Atlanta Chicago Cleveland New York
Philadelphia Pittsburgh Dallas

Pacific Coast Representative:
United States Steel Products Company
Los Angeles Portland San Francisco Seattle

Export Representative:
United States Steel Products Company, New York, N. Y.

If he says "they'll go" they'll go ~

If the inspection and testing of the materials and workmanship in the motor busses you buy are in the hands of the P.T.L. Inspectors—you are not only assured of the highest quality throughout but you know that every part is in perfect running order and will give the service you have a right to expect.

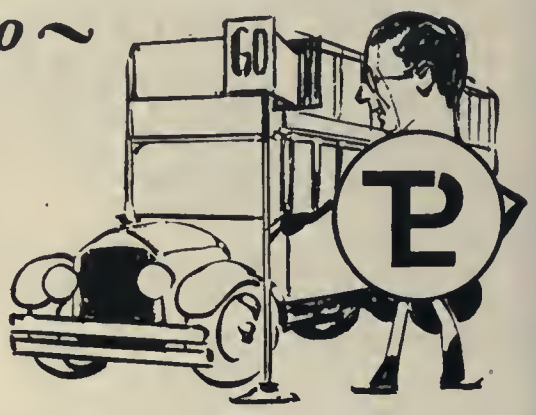
P.T.L. Bulletin No. 28 gives all the facts covering this service.

PITTSBURGH TESTING LABORATORY

Inspecting Engineers and Chemists

PITTSBURGH PENNA.

Branch Offices in the Principal Cities.





AIMCO

Electric Railway Automatic Signals

for Accessibility and Reliability

EST. 1855 AIMCO INC. 1915

"American" INSULATING MACHINERY COMPANY

REG. U.S. PAT. OFF.

Philadelphia, New York, Paris, England

Sales Agents:

Electric Service Supplies Co.

Philadelphia New York Chicago

TULC A LUBRICANT

We make a specialty of

ELECTRIC RAILWAY LUBRICATION

We solicit a test of TULC on your equipment

The Universal Lubricating Co.

Cleveland, Ohio

Chicago Representatives: Jameson-Rose Company, Straus Bldg.

THE WORLD'S STANDARD

"IRVINGTON"

Black and Yellow

Varnished Silk, Varnished Cambric, Varnished Paper

Irr-O-Slot Insulation Flexible Varnished Tubing

Insulating Varnishes and Compounds

Irvington Varnish & Insulator Co.

Irvington, N. J.

Sales Representatives in the Principal Cities



DON'T REMOVE WORN WHEELS

This shoe does the work while your car is in service.

SAVES TIME—SAVES LABOR—SAVES MONEY

WHEEL TRUING BRAKE SHOE CO.
Detroit, Mich.

B. A. HEGEMAN, Jr., President H. A. HEGEMAN, First Vice-Pres. and Treas.
F. T. SARGENT, Secretary W. C. PETERS, Vice-Pres. Sales and Engineering

National Railway Appliance Co.

Grand Central Terminal, 452 Lexington Ave., Cor. 45th St., New York.

BRANCH OFFICES

Munsey Building, Washington, D. C. 100 Boylston Street, Boston, Mass.
Hegeman-Castle Corporation, Railway Exchange Building, Chicago, Ill.

RAILWAY SUPPLIES

Tool Steel Gears and Pinions
Anglo-American Varnish Co., Varnishes, Enamels, Etc.
National Hand Holds
Genesco Paint Oils
Dunham Hopper Door Device
Garland Ventilators
Economy Electric Devices Co., Power Saving and Inspection Meters
Fort Pitt Spring and Mfg. Co., Springs
Cutler Hammer Electric Heaters
Flaxlinum Insulation
Anderson Slack Adjusters
Yellow Coach Mfg. Company—Single and Double-deck Buses
Walter Tractor Snow Plows

Instantaneous Registration by the Passenger

ROOKE SYSTEM of fare collection

Meets every condition for all types of cars and buses. The stand device, as shown, adapts it to one-man uses—making register *portable* or *stationary*, at option. Handles nickels, dimes, quarters, or metal tickets, in *any combination*, FLEXIBILITY with CERTAINTY.



Rooke Automatic Register Company Providence, R. I.

SEARCHLIGHT SECTION

USED EQUIPMENT & NEW—BUSINESS OPPORTUNITIES

UNDISPLAYED—RATE PER WORD:

Positions Wanted, 4 cents a word, minimum 75 cents an insertion, payable in advance.

Positions Vacant and all other classifications, 8 cents a word, minimum charge $2.00.

Proposals, 40 cents a line an insertion.

INFORMATION:

Box Numbers in care of any of our offices count 10 words additional in undisplayed ads.

Discount of 10% if one payment is made in advance for four consecutive insertions of undisplayed ads (not including proposals).

DISPLAYED—RATE PER INCH:

1 to 3 inches.....$4.50 an inch
4 to 7 inches..... 4.30 an inch
8 to 14 inches..... 4.10 an inch

Rates for larger spaces, or yearly rates, on request.

An *advertising inch* is measured vertically on one column, 3 columns—30 inches—to a page.

ERJ

POSITIONS WANTED

TEN years' experience as railway winder. Steam and electric railway experience. Can give A-1 statement in regard to my work. Will go anywhere. PW-911, Electric Railway Journal, 7 So. Dearborn St., Chicago, Ill.

YOUNG MAN, 28, wide experience motor bus operation. Sound secretarial, accountancy, traffic, engineering experience. Now holding executive appointment with large British Company operating 700 vehicles, would consider similar appointment in U. S. A. Unlimited scope essential for real live man of sound experience and proved judgment. PW-913, Electric Railway Journal, Tenth Ave. at 36th St., New York.

To Employers Who Advertise for Men:

The letters you receive in answer to your advertisements are submitted by each of the applicants with the hope of securing the position offered.

When there are many applicants it frequently happens that the only letters acknowledged are those of promising candidates. Others do not receive the slightest indication that their letters have even been received, much less given any consideration. These men often become discouraged, will not respond to future advertisements, and sometimes even question if they are bona fide.

We can guarantee that *Every Advertisement Printed in the Searchlight Section Is Duly Authorized.* Now won't you help keep our readers interested in this advertising by acknowledging every application received, even if you only return the letters of unsuccessful applicants to them marked, say, "Position filled, thank you." If you don't care to reveal your identity, mail them in plain envelopes.

We suggest this in a spirit of helpful co-operation between employers and the men replying to Positions Vacant advertisements.

Searchlight Department
McGRAW-HILL PUBLISHING COMPANY, INC.
"Put Yourself in the Place of the Other Fellow"

OFFICIAL PROPOSALS

Bids: June 16.

Special Trackwork Channels and Appurtenances—Broad Street Subway

CONTRACT NO. 124
DEPARTMENT OF CITY TRANSIT
11th FLOOR, 1211 CHESTNUT ST.

Philadelphia, May 18, 1926.

Sealed proposals, addressed to the undersigned, at the office above mentioned, will be received until 11 o'clock (Eastern Standard Time), on Wednesday, June 16, 1926, and publicly opened immediately thereafter, for furnishing special trackwork, channels and appurtenances for the Broad Street Subway.

Plans and specifications may be seen at the office of the Department, on the 12th floor, 1211 Chestnut Street, and copies of same, with blank forms for proposals, will be supplied to intending bidders upon application. A deposit of Fifty (50) Dollars will be required for the plans and specifications. This deposit will be refunded upon return of the plans and specifications in good condition.

Bidders must be skilled and regularly engaged in the class of work for which they are competing.

No bid will be considered unless accompanied by a certified check on a responsible bank or trust company in favor of the City of Philadelphia, to the amount of five (5) per centum of the sum of such bid, in accordance with the provisions of an ordinance approved March 7, 1924, as amended by ordinance approved July 2, 1924, and reprinted in full in the specifications.

The Director reserves the right to reject any or all bids, as he may deem best for the interest of the City of Philadelphia.

H. E. EHLERS,
Director.

OFFICIAL PROPOSALS

Bids: June 23.

Special Trackwork and Appurtenances—Terminal Yard —Broad Street Subway

CONTRACT NO. 125
DEPARTMENT OF CITY TRANSIT
11TH FLOOR, 1211 CHESTNUT ST.

Philadelphia, May 25, 1926.

Sealed proposals, addressed to the undersigned, at the office above mentioned, will be received until 11 o'clock (Eastern Standard Time), on Wednesday, June 23, 1926, and publicly opened immediately thereafter, for furnishing special trackwork, and all appurtenances for the Fern Rock Terminal Yard of the Broad Street Subway.

Plans and specifications may be seen at the office of the Department, on the twelfth floor, 1211 Chestnut Street, and copies of same, with blank forms for proposals, will be supplied to intending bidders upon application. A deposit of Fifty (50) Dollars will be required for the plans and specifications. This deposit will be refunded upon return of the plans and specifications in good condition.

Bidders must be skilled and regularly engaged in the class of work for which they are competing.

No bid will be considered unless accompanied by a certified check on a responsible bank or trust company in favor of the City of Philadelphia to the amount of five (5) per centum of the sum of such bid, in accordance with the provisions of an ordinance approved March 7, 1924, as amended by ordinance approved July 2, 1924, and reprinted in full in the specifications.

The Director reserves the right to reject any or all bids, as he may deem best for the interest of the City of Philadelphia.

H. E. EHLERS,
Director.

Rotary Converters

1—500 kw., 600-v., 833 amp., 900 r.p.m., 6-ph., compound wound Westinghouse Rotary Converter, with 3—165 kva., 60-cy., single ph., 13200 v. primary transformers with A.C. and D.C. panels.

1—300 kw., 600-v., 500 amp., 1200 r.p.m., 6-ph., compound wound interpole Westinghouse Rotary Converter, with 3—110 kva., 60-cy., single ph., 13200-v. primary transformers with A.C. and D.C. panels.

GEO. SACHSENMAIER CO.
926 N. Third St., Philadelphia, Pa.

SAVE 30% TO 50% ON
RAILS-LOCOMOTIVES-CARS
Economy—Service
Quality—Reliability
HYMAN-MICHAELS COMPANY
Peoples Gas Bldg., Chicago
ST. LOUIS — DALLAS — LOS ANGELES
SAN FRANCISCO — PORTLAND — SEATTLE

SEARCHLIGHT SERVICE SECURES SATISFACTORY SITUATIONS
G-23

FOR SALE
30 Birney Safety Cars
Brill Built
West. 508 or G. E. 264 Motors. Cars Complete—Low Price—Fine Condition.
ELECTRIC EQUIPMENT CO.
Commonwealth Bldg., Philadelphia, Pa.

WHAT AND WHERE TO BUY

Equipment, Apparatus and Supplies Used by the Electric Railway Industry with Names of Manufacturers and Distributors Advertising in this Issue

Advertising, Street Car
Collier, Inc., Barron G.

Air Brakes
Christensen Air Brake Co.
Westinghouse Air Brake Co.

Air Receivers & Aftercoolers
Ingersoll-Rand Co.

Anchors, Guy
Elec. Service Supplies Co.
Ohio Brass Co.
Westinghouse Elec. & M. Co.

Armature Shop Tools
Elec. Service Supplies Co.

Automatic Return Switch Stand
Ramapo Ajax Corp.

Automatic Safety Switch Stands
Ramapo Ajax Corp.

Axles
Bemis Car Truck Co.
Bethlehem Steel Co.
Brill Co., The J. G.
Carnegie Steel Co.
Johnson & Co., J. R.
National Ry. Appliance Co.
Standard Steel Works
Westinghouse Elec. & Mfg. Co.

Axles, Carbon Vanadium
Johnson & Co., J. R.

Axles, Steel
Bethlehem Steel Co.
Carnegie Steel Co.
Johnson & Co., J. R.

Babbit Metal
Ajax Metal Co.
Johnson & Co., J. R.
More-Jones Brass & Metal Co.

Badges and Buttons
Elec. Service Supplies Co.
International Register Co.

Batteries, Dry
National Carbon Co.
Nichols-Lintern Co.

Bearings and Bearing Metals
Ajax Metal Co.
Bemis Car Truck Co.
Brill Co., The J. G.
General Electric Co.
More-Jones Brass & Metal Co.
Westinghouse Elec. & M. Co.

Bearings, Center and Roller Side
Stucki Co., A.

Bells and Buzzers
Consolidated Car Heating Co.

Bells and Gongs
Brill Co., The J. G.
Elec. Service Supplies Co.

Benders, Rail
Railway Track-work Co.

Bodies, Bus
Auto Body Co., The
Baker-Raulang Co., The
Cummings Car & Coach Co.

Bodies, Passenger Car
Baker-Raulang Co., The

Body Material, Haskelite & Plymetl
Haskelite Mfg. Corp.

Boilers
Babcock & Wilcox Co., The

Boiler Tubes
National Tube Co.

Bond Testers
Amer. Steel & Wire Co.
Elec. Service Supplies Co.

Bonding Apparatus
Amer. Steel & Wire Co.
Elec. Ry. Improvement Co.
Elec. Service Supplies Co.
Ohio Brass Co.
Railway Track-work Co.
Una Welding & Bonding Co.

Bonds, Rail
Amer. Steel & Wire Co.
Elec. Ry. Improvement Co.
Elec. Service Supplies Co.
General Electric Co.
Ohio Brass Co.
Railway Track-work Co.
Una Welding & Bonding Co.
Westinghouse Elec. & M. Co.

Brackets and Cross Arms (See also Poles, Ties, Posts etc.)
Elec. Ry. Equipment Co.
Elec. Service Supplies Co.
Hubbard & Co.
Ohio Brass Co.

Brake Adjusters
Brill Co., The J. G.
Nat'l Ry. Appliance Co.
Westinghouse Tr. Br. Co.

Brake Shoes
Bemis Car Truck Co.
Brill Co., The J. G.
Wheel Truing Brake Shoe Co.

Brakes, Brake Systems and Brake Parts
Bemis Car Truck Co.
Brill Co., The J. G.
General Electric Co.
National Brake Co.
Safety Car Devices Co.
Westinghouse Tr. Br. Co.

Brushes, Carbon
General Electric Co.
Jeandron, W. J.
Le Carbone Co.
National Carbon Co.
Westinghouse Elec. & M. Co.

Brushes, Graphite
National Carbon Co.

Brushes, Metal Graphite
National Carbon Co.

Brushes, Wire Pneumatic
Ingersoll-Rand Co.

Bulkheads
Haskelite Mfg. Corp.

Buses, Motor
Auto Body Co.
Brill Co., The J. G.
Cummings Car & Coach Co.
Graham Bros.
International Harvester Co.
International Motor Co.
Mack Trucks
Yellow Truck & Coach Mfg. Co.

Bus Seats
Hale-Kilburn Co.

Bushings, Case Hardened and Manganese
Bemis Car Truck Co.
Brill Co., The J. G.

Cables (See Wires and Cables)

Cambric Tapes, Yellow & Black Varnish
Irvington Varnish & Ins. Co.

Cambric Yellow & Black Varnish
Mica Insulator Co.

Carbon Brushes (See Brushes, Carbon)

Carbon Paste, Welding
National Carbon Co.

Carbon Plates, Welding
National Carbon Co.

Carbon Rods, Welding
National Carbon Co.

Car Lighting Fixtures
Elec. Service Supplies Co.

Car Panel Safety Switches
Consolidated Car Heating Co.
Westinghouse Elec. & M. Co.

Car Wheels, Rolled Steel
Bethlehem Steel Co.

Cars, Dump
Brill Co., The J. G.
Differential Steel Car Co., Inc.

Cars, Gas, Rail
Brill Co., The J. G.

Cars, Passenger, Freight Express, etc.
American Car Co.
Brill Co., The J. G.
Cummings Car & Coach Co.
Kuhlman Car Co., G. C.
National Ry. Appliance Co.
Wason Mfg. Co.

Cars, Second Hand
Electric Equipment Co.

Cars, Self-Propelled
Brill Co., The J. G.
General Electric Co.

Castings, Brass Composition or Copper
Ajax Metal Co.
More-Jones Brass & Metal Co.

Castings, Gray Iron and Steel
Amer. Steel Foundries
Bemis Car Truck Co.
Standard Steel Works
Wm. Wharton, Jr. & Co.

Castings, Malleable & Brass
Bemis Car Truck Co.

Catchers and Retrievers, Trolley
Earll, C. I.
Elec. Service Supplies Co.
Ohio Brass Co.
Wood Co., Chas. N.

Catenary Construction
Archbold-Brady Co.

Ceiling Car
Haskelite Mfg. Corp
Pantasote Co., Inc., The

Ceilings, Plywood Panels
Haskelite Mfg. Corp.

Cement
N. Amer. Cement Corp.

Cement Accellerator
North American Cement Corp.

Change Carriers
Cleveland Fare Box Co.
Electric Service Supplies Co.

Circuit Breakers
General Electric Co.
Westinghouse Elec. & M. Co.

Clamps and Connectors for Wires and Cables
Elec. Ry. Equipment Co.
Elec. Ry. Improvement Co.
Elec. Service Supplies Co.
General Electric Co.
Hubbard & Co.
Ohio Brass Co.
Westinghouse Elec. & M. Co.

Cleaners and Scrapers, Track (See also Snow-Plows, Sweepers and Brooms)
Brill Co., The J. G.
Ohio Brass Co.

Clusters and Sockets
General Electric Co.

Coal and Ash Handling (See Conveying and Hoisting Machinery)

Coil Banding and Winding Machines
Electric Service Sup. Co.
Westinghouse Elec. & M. Co.

Coils, Armature and Field
General Electric Co.
Westinghouse Elec. & M. Co.

Coils, Choke and Kicking
Electric Service Supplies Co.
General Electric Co.
Westinghouse Elec. & M. Co.

Coin-Counting Machines
Cleveland Fare Box Co
International Register Co.

Coin Sorting Machines
Cleveland Fare Box Co.

Coin Wrappers
Cleveland Fare Box Co.

Commutator Slotters
Electric Service Supplies Co.
General Electric Co.
Westinghouse Elec. & M. Co.
Wood Co., Chas. N.

Commutator Truing Devices
General Electric Co.

Commutators or Parts
Cameron Elec'l Mfg. Co.
General Electric Co.
Westinghouse Elec. & M. Co.

Compressors, Air
General Electric Co.
Ingersoll-Rand Co.
Westinghouse Tr Br. Co.

Compressors, Air Portable
Ingersoll-Rand Co.

Condensers
General Electric Co.
Ingersoll-Rand Co.
Westinghouse Elec. & M. Co.

Condensor Papers
Irvington Varnish & Ins. Co.

Conduits, Underground
Std. Underground Cable Co.

Connectors, Solderless
Westinghouse Elec. & M. Co.

Connectors, Trailer Car
Consolidated Car Heating Co.
Elec. Service Supplies Co.
Ohio Brass Co.

Controllers or Parts
General Electric Co.
Westinghouse Elec. & M. Co.

Controller Regulators
Electric Service Supplies Co.

Controlling Systems
General Electric Co.
Westinghouse Elec. & M. Co.

Converters, Rotary
General Electric Co.
Westinghouse Elec. & M. Co.

Copper Wire
American Brass Co., The
American Steel & Wire Co.
Anaconda Copper Mining Co.

Copper Wire Instruments, Measuring, Testing and Recording
American Brass Co., The
Anaconda Copper Mining Co.
American Steel & Wire Co.

Cord, Bell, Trolley, Register, etc.
Brill Co., The J. G.
Electric Service Supplies Co.
International Register Co.
Roeblings Sons Co., John A.
Samson Cordage Works
Silver Lake Co.

Cord Connectors and Couplers
Electric Service Supplies Co.
Samson Cordage Works
Wood Co., Chas. N.

Couplers, Car
American Steel Foundries
Brill Co., The J. G.
Ohio Brass Co.
Westinghouse Tr. Br. Co

Cranes, Electric, Industrial, Truck-Mounted
Baker-Raulang Co., The

Cranes, Hoists and Lifts
Buda Co., The
Electric Service Supplies Co.

Cross Arms (See Brackets)

Crossings
Ramapo Ajax Corp.
Wm. Wharton, Jr. & Co.

Crossings, Frogs and Switches
Ramapo Ajax Corp.
Wm. Wharton Jr. & Co.

Crossings, Manganese
Bethlehem Steel Co.
Ramapo Ajax Corp.
Wm. Wharton, Jr. & Co.

Crossing Signals. (See Signal Systems, Highway Crossing)

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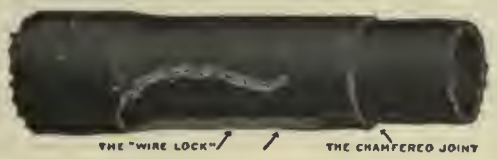
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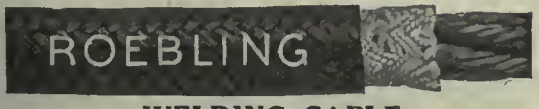
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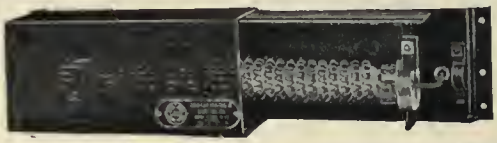
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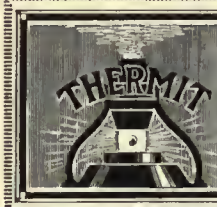
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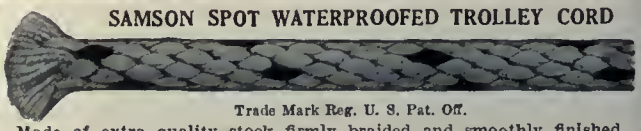


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MANGANESE CONSTRUCTION
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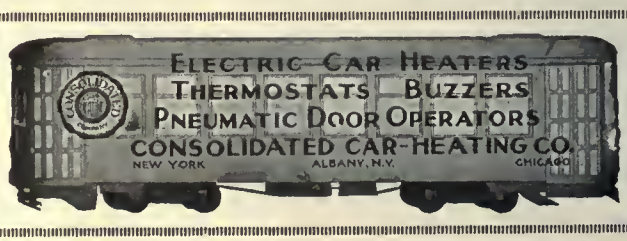
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for Cars and Buses

N-L

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Cleveland, Ohio





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Oliver Bldg.
Pittsburgh, Pa.

ALPHABETICAL INDEX TO ADVERTISEMENTS

Page

A

Ajax Metal Co., The 46
Allison Co., J. E..... 24
American Brass Co., The 55
American Car Co..... 59
American Electrical Works 55
American Insulating Machinery Co. 50
American Steel & Wire Co..... 40
American Steel Foundries 6
Anaconda Copper Mining Co.... 55
Anchor Webbing Co..... 55
Archbold-Brady Co..... 25
Auto Body Co., The 33

B

Babcock & Wilcox Co..... 49
Baker-Raulang Co..... 36
Beeler Organization 24
Bell Lumber Co..... 55
Bemis Car Truck Co..... 18
Bethlehem Steel Company 49
Bibbins, J. Rowland 24
Brill Co., The J. G..... 59
Buchanan & Layng Corp..... 25
Buda Co., The 49
Budd Wheel Co..... 28

C

Cameron, A. S., Steam Pump Wks. (Ingersoll-Rand Co.)... 53
Cameron Electrical Mfg. Co.... 25
Carnegie Steel Co..... 39
Chillingworth Mfg. Co..... 56
Christensen Air Brake Co..... 27
Cleveland Fare Box Co..... 55
Collier, Inc., Barron G..... 42
Consolidated Car Fender Co.... 56
Consolidated Car Heating Co... 56
Continental Motors Corp'n..... 58
Cummings Car & Coach Co..... 35

D

Day & Zimmermann, Inc..... 24
Differential Steel Car Co., The . 49
Dixon Crucible Co., Joseph.... 46
Drum & Co., A. L..... 24

Page

E

Earll, C. I..... 48
Electric Equipment Co..... 51
Electric Ry. Equipment Co.... 55
Electric Ry. Improvement Co... 8
Electric Service Supplies Co.... 9

F

Firestone Tire & Rubber Co... 26
Ford, Bacon & Davis 24
"For Sale" Ads 51

G

General Electric Co., 22, Back Cover
Gold Car Heating & Ltg. Co... 56
Graham Brothers 29
Griffin Wheel Co..... 46

H

Hale-Kilburn Co..... 10
Haskelite Mfg. Co..... 57
"Help Wanted" Ads 51
Hemphill & Wells 24
Holst, Englehard W..... 24
Hubbard & Co..... 48
Hyman-Michaels Co..... 51

I

Ingersoll-Rand Co. (A. S. Cameron Steam Pump Wks.). 53
International Harvester Co. of America 31
International Motor Co., Inc. 20, 21
International Oxygen Co..... 56
International Register Co..... 47
International Steel Tie Co., The. 7
Irvington Varnish & Insulator Co. 50

J

Jackson, Walter 24
Jeandron, W. J..... 48
Johnson & Co., Inc., T. R..... 56

K

Kelker, DeLeuw & Co..... 24
Kelly, Cooke & Co..... 25
Kuhlman Car Co..... 59

Page

L

Le Carbone Co..... 48
Lorain Steel Co..... 49

M

Mack Trucks, Inc..... 20, 21
McClellan & Junkersfeld 24
Metal & Thermit Corp..... 56
Mica Insulator Co..... 48
Mohawk Rubber Co., The 25
More-Jones Brass & Metal Co... 46
Morton Mfg. Co..... 56

N

Nachod and United States Signal Co., Inc..... 56
National Brake Co..... 23
National Carbon Co., Inc., Front Cover
National Pneumatic Co., Inc.... 15
National Ry. Appliance Co..... 50
National Tube Co..... 38
Naugle Pole & Tie Co..... 55
Nichols-Lintern Co., The..... 56
North American Cement Corp.. 45
Nuttall Co., R. D..... 45

O

Ohio Brass Co..... 5
Ohmer Fare Register Co..... 32
Okonite-Callender Cable Co., Inc., The 55
Okonite Co., The 55

P

Pantasote Co., Inc..... 47
Perey Mfg. Co., Inc..... 25
Pittsburgh Testing Laboratory . 50
Positions Wanted and Vacant... 51

R

Rail Joint Co., The 49
Railway Track-work Co..... 57
Railway Utility Co..... 56
Ramapo Ajax Co..... 56
Richey, Albert S..... 24
Roebling's Sons Co., John A... 55
Rooke Automatic Register Co.. 56

Page

S

Sachsenmaier Co., Geo..... 51
Safety Car Devices Co..... 16
Samson Cordage Co..... 56
Sanderson & Porter 24
Searchlight Section 51
Silver Lake Co..... 55
Smith Heater Co., Peter 56
Standard Steel Works Co..... 37
Standard Underground Cable Co. 47
Star Brass Works 48
Stevens & Wood, Inc..... 24
Stone & Webster 24
Stucki Co., A..... 56

T

Texas Company 36
Tool Steel Gear & Pinion Co... 47

U

Una Welding & Bonding Co.... 25
Union Switch & Signal Co..... 19
Universal Lubricating Co..... 50

V

Valentine & Company 34

W

"Want" Ads 51
Wason Mfg. Co..... 59
West Coast Lumber Trade Extension Bureau 41
Westinghouse Elec. & Mfg. Co.. 2, 4
Westinghouse Traction Brake Co. 17
Wharton, Wm., Jr. & Co., Inc.. 49
"What and Where to Buy" 52, 54, 57
Wheel Truing Brake Shoe Co... 50
White Eng. Corp., The J. G.... 24
Wish Service, The P. Edw..... 25
Wood Co., Chas. N..... 56

Y

Yellow Truck & Coach Mfg. Co. Insert, 11, 12, 13, 14

WHAT AND WHERE TO BUY

(Continued from Page 54)

Turbines, Steam
General Electric Co.
Westinghouse Elec. & M. Co.

Turnstiles
Electric Service Supplies Co.
Ohio Brass Co.
Perey Mfg. Co., Inc.

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Westinghouse Tr. Br. Co.

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National Ry. Appliance Co.
Nichols-Lintern Co.
Railway Utility Co.

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Haskelite Mfg. Corp.

Weatherproofing
Morton Mfg. Co.

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Lorain Steel Co.
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Electric Ry. Imp. Co.
Ohio Brass Co.
Railway Track-work Co.
Una Welding & Bonding Co
Westinghouse Elec. & Mfg. Co.

Welders, Rail Joint
Ohio Brass Co.
Railway Trackwork Co.

Welding & Cutting Tools
International Oxygen Co.

Welding Processes and Apparatus
Elec. Ry. Improvement Co.
General Electric Co.
Metal & Thermit Corp.
National Ry. Appliance Co.
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Electric Ry. Improvement Co.
Railway Track-work Co.
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American Steel & Wire Co.
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Welding Wire and Rods
Railway Track-work Co.

Wheels, Car, Cast Iron
Bemis Car Truck Co.
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Wheels, Car, Steel & Steel Tire
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Carnegie Steel Co.
Standard Steel Works

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Wheel Guards (See Fenders and Wheel Guards)

Wheel Grinders
Wheel Truing Brake Shoe Co.

Wheel Presses (See Machine Tools)

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Standard Underground Cable Co.
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RAIL GRINDERS AND WELDERS

Railway Track-work Co., Philadelphia

682

Our advertisement in the issue of May 29 showed how

HASKELITE *and* PLYMETL

effected savings in operating cost on the Grand Rapids cars. Another advertisement will appear in the issue of June 12.

HASKELITE MANUFACTURING CORPORATION
133 W. Washington Street, Chicago, Illinois



The Best Way to Cover the Route

Getting the bus over the route and on time always, is a patronage builder which is reflected in growing profits.

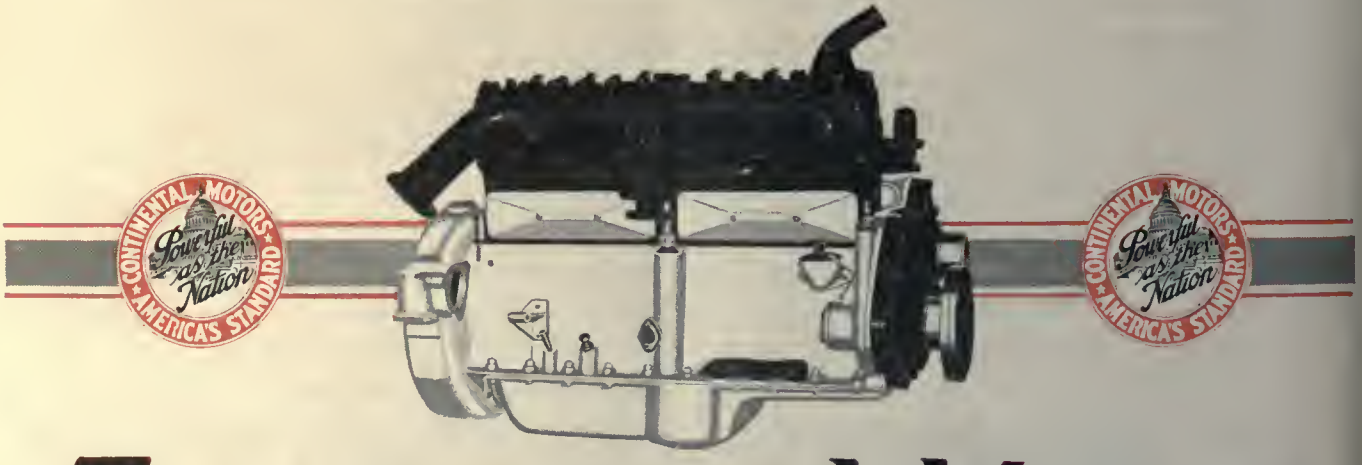
The operator who drives a bus equipped with a Continental Motor has at hand a flexibility of power which easily responds to the level road or tortuous hill.

And the bus owner can know that through Continental power and dependability his busses will be able to consistently keep to the schedule and economically cover the route.

CONTINENTAL MOTORS CORPORATION

Offices: Detroit, Mich., U. S. A. *Factories:* Detroit and Muskegon

The Largest Exclusive Motor Manufacturer in the World



Continental Motors

Brill "Admor" Seat







Increased Seating Capacity

Improved Public Relations

Adapted to both end and center platforms of cars equipped with either slat or upholstered seats.



Easily and quickly operated.

Separates incoming and outgoing passengers at service doors.

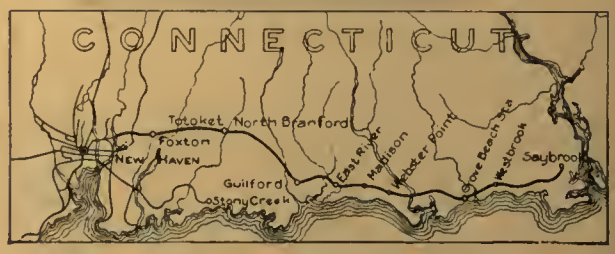
The Brill "Admor" Seat (patented) makes it possible to utilize the space in front of non-operating platform doors for additional seating accommodations. Brooklyn City Railroad with 535 cars equipped, Asheville Power & Light Company, City of Miami, The Washington Railway & Electric Co. on its 15 new cars, and the Chilian Electric Co. of Santiago on 30 cars now building have already taken advantage of its facilities. Further details furnished upon request.

THE J. G. BRILL COMPANY
PHILADELPHIA, PA.

AMERICAN CAR CO. ST. LOUIS MO. — G.C. KUHLMAN CAR CO. CLEVELAND, OHIO. — WASON MANF'G CO. SPRINGFIELD, MASS.



The modern car has demonstrated its increased earning power, even to bringing a shutdown property back to life. It is the railways' greatest asset.



Modern cars, one-man operated, have turned loss into profit for the New Haven & Shore Line

Operating costs per car-mile, 1924:

Maintenance of way and structures	2.27 cts.
Maintenance of equipment	2.04 cts.
Power (delivered to cars)	4.89 cts.
Conducting transportation	5.24 cts.
General and miscellaneous	5.51 cts.
Total	19.95 cts.

Modern equipment used:

Motors (4-25 h.p.)	GE-264A
Control (double-end)	G-E type K-35
Air brakes	G-E with safety car control
Compressors	G-E type CP-27B

The resources and the service of the entire G-E organization are available to consider the problems of modernization and co-ordination—to find the most effective means of transportation and recommend and build appropriate equipment to meet each particular requirement in any community.

11-68

GENERAL ELECTRIC

McGraw-Hill Publishing Company, Inc. June 12, 1926 Twenty Cents per Copy

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HOUSTON, TEXAS.

ELECTRIC RAILWAY JOURNAL



John R. McKay, *Chief Engineer, Indiana Service Corporation, Fort Wayne. Mr. McKay is numbered among America's better known electric railway engineers. He is a member of the Standing Committee on Way and Structures of the A. E. R. E. A.*

"We build for smoothness and easy riding"

"WE have taken special pains in our track construction work to build for smoothness and easy riding, both for our own cars and for automobile traffic." So says John R. McKay, Chief Engineer of the Indiana Service Corporation.

"Particular attention has been paid to arterial crossings, with the result that motorists can cross the tracks without feeling them at all.

"We have been greatly aided in our endeavor to get smoother, less noisy crossings, by the use of an asphaltic cushion next to the rails. This has the advantage of being easily applied, and in addition to deadening sound it gives us a tight construction that keeps out water."

Fort Wayne electric railway tracks in process of construction—showing the slabs of Carey Elastite Rail Filler in place.

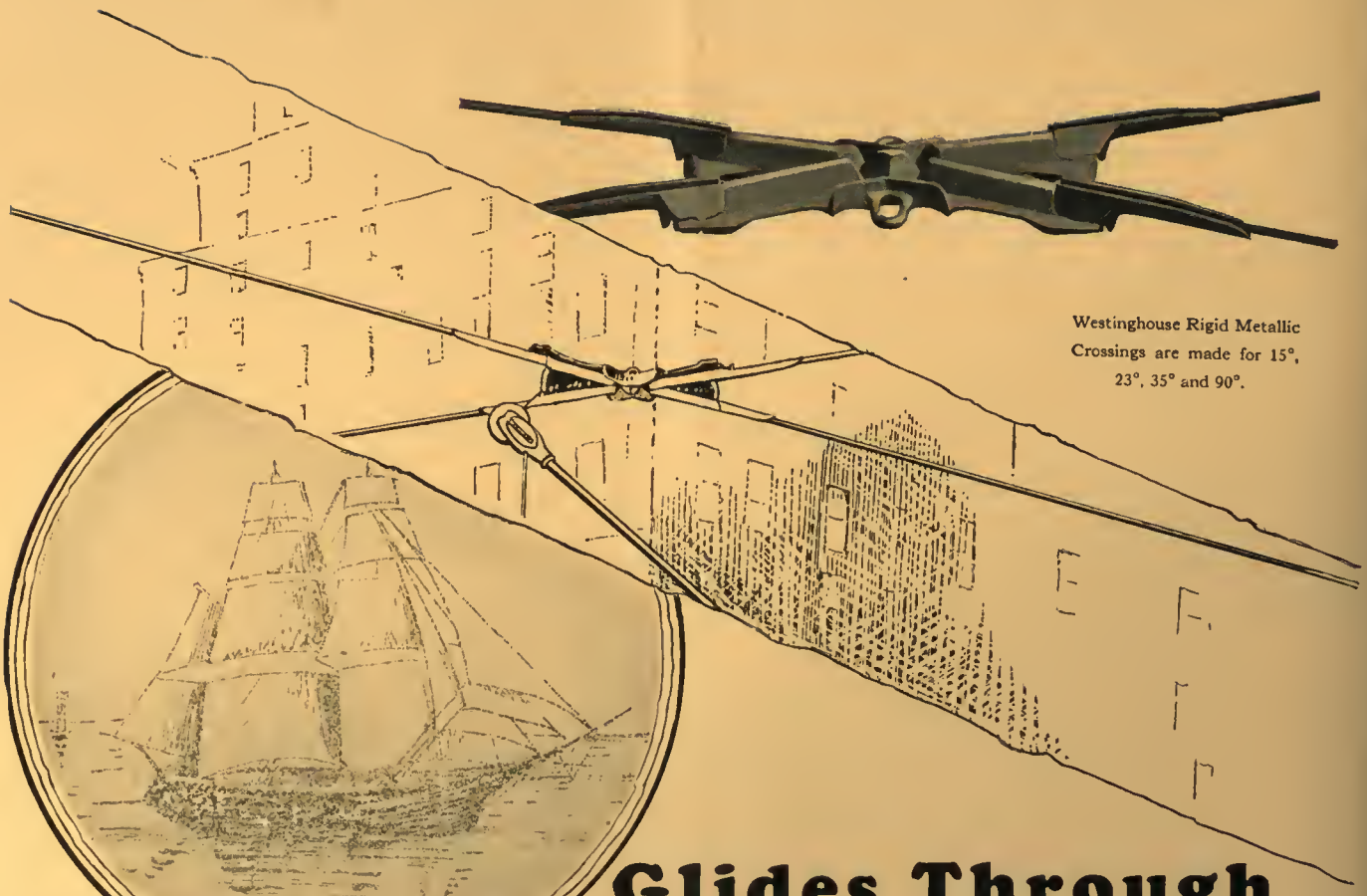


To improve track construction in Fort Wayne, the Indiana Service Corporation has made extensive use of the Carey Elastite System of Track Insulation—and with highly successful results. Complete information on request.

THE Carey Elastite System of Track Insulation consists of precast slabs of a fibrous asphaltic compound, which form a resilient cushion between rails and pavement. A blow with a sledge sets the slabs in place. Unaffected by moisture or changes in temperature.

Carey Elastite
SYSTEM OF
TRACK INSULATION

THE PHILIP CAREY COMPANY, LOCKLAND, CINCINNATI, OHIO



Westinghouse Rigid Metallic Crossings are made for 15°, 23°, 35° and 90°.

Glides Through

Smoothly and Quietly

THE trolley wheel glides through the crossing as easily as over the plain wire.

Long flexible approaches lead the wheel onto the crossing without pounding or arcing.

The trolley wheel rides on the ridge clear through the crossing. The ridge is high and continuous except for two slots in which the flanges of a crossing trolley wheel may travel. As the wheel flanges never ride on the pan the pan receives no wear.

Smooth, quiet operation and long service are characteristic of Westinghouse crossings.

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1926

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Vol. 67
No. 23

CONTENTS

Pages
999-1036

JUNE 12, 1926

Editorials 999

25 Years of Electric Operation in Italy 1002

BY GIUSSEPPE BIANCHI.

Three-phase system has given a good account of itself and has greatly increased capacity of the Italian State Railways. The system is extended and 3,000-volt direct-current lines are being built also.

Beaver Valley Enters the World of Art 1007

In Commemoration of Easton's Railway 1008

Subsidized Bus Lines in Houston Serve Recently Established Suburbs 1008

Maintaining the Morale in Atlanta 1009

Transportation men encouraged to neatness by free shoe shines and clothes pressing at carhouse. Suggestion box and full-length mirrors in trainmen's headquarters. Social clubs, safety work, credit union and other activities among employees.

Why Electric Cars Will Remain in Berlin 1011

Transportation expert calculates that if buses were substituted for electric cars in local city service fares would have to be doubled.

Transportation Service Continued During Flood 1013

Citizens of Oil City, Pa., are carried by buses and emergency equipment during the recent devastating ice jam on the Allegheny. Trolley service quickly restored.

Police Officers Can Do Much to Improve Transportation 1015

BY STANLEY GOOD.

Control of traffic should be the basis of service to the people and in proportion to the number served and not to help the company as such.

Milwaukee Cars Carry Heaviest Traffic 1015

Maintenance Notes 1016

Association News 1019

Operating Problems Hold Attention at Canadian Convention 1019

Bus operation, budgetary control and maintenance practice are principal topics at Quebec meeting. Attractive exhibits are shown.

The Motor Bus in Urban Transportation 1021

BY DEAN J. LOCKE.

Co-ordination an essential. Rail service should not be duplicated. Extent to which facilities may be used in common is discussed.

American Association News 1022

News of the Industry 1023

Recent Bus Developments 1029

Financial and Corporate 1030

Book Reviews 1033

Personal Mention 1034

Manufactures and the Markets 1035

Removing

the Isolation of the Small City

A SINGLE thought from the remarks of G. O. Rushing, master mechanic of the Shreveport Railways of Louisiana, made at a recent railway meeting shows the value of the technical press.

"Our property," he said, "is way up in the state, and there we need ELECTRIC RAILWAY JOURNAL and we use it."

Shreveport is only one town that is a long way off the beaten track and away from the influence of large communities. But it is typical of many. To such properties, as well as those more centrally located, the JOURNAL carries its message weekly.

Mr. Rushing gets the news of the industry, the latest developments and data on the latest products as promptly and as completely as do executives in cities of a million population. His isolation, however, intensifies the value of this service.

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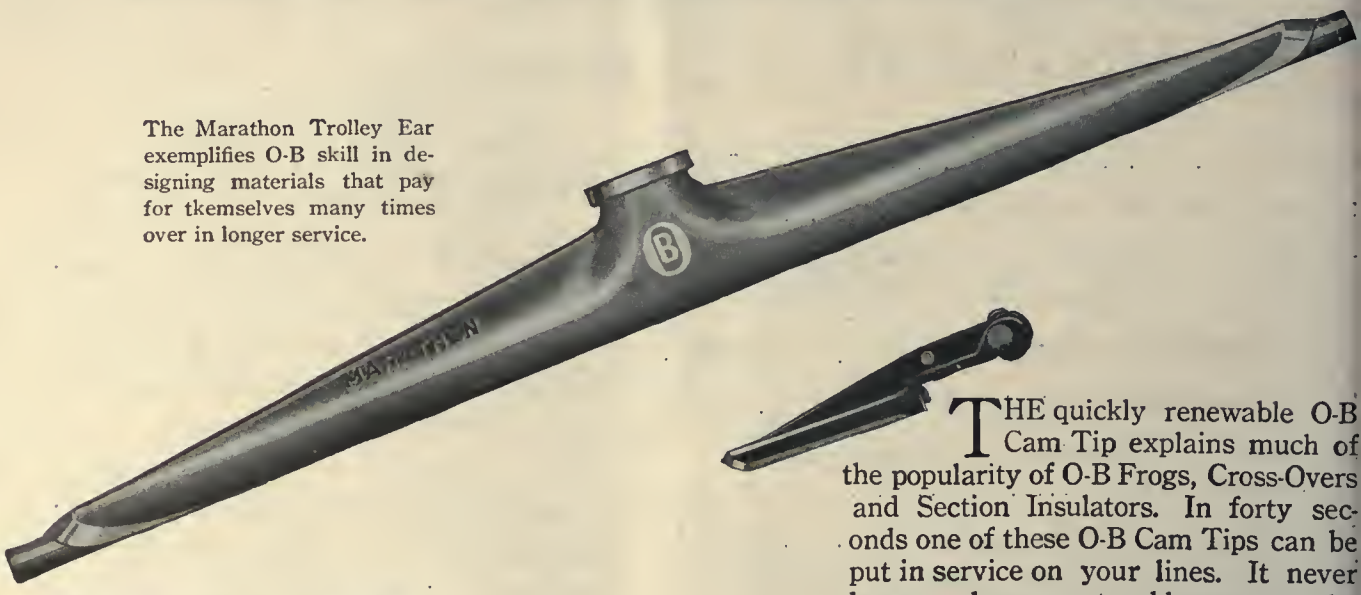
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Yes, Marathon Ears

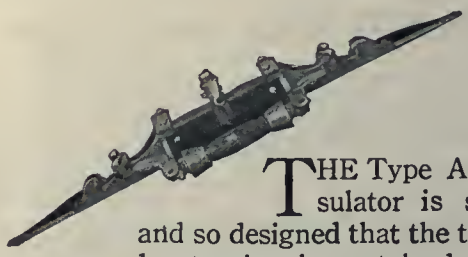


The Marathon Trolley Ear exemplifies O-B skill in designing materials that pay for tkemselves many times over in longer service.

THE quickly renewable O-B Cam Tip explains much of the popularity of O-B Frogs, Cross-Overs and Section Insulators. In forty seconds one of these O-B Cam Tips can be put in service on your lines. It never becomes loose or troublesome on the wire. Provides a smooth approach for the trolley wheel, without arc or bump.



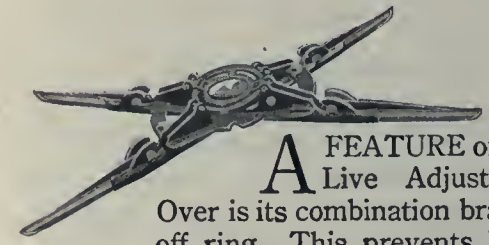
SHOCK absorbers, in the form of O-B Spring Lock Hangers, play an important part in the scheme of economical railway operation. They take the hard spots out of the overhead by providing a cushion between ear and bracket arm or span. By softening the shock from the wheel as it passes under the suspension point, they materially reduce wear and depreciation. Made in barn or span type.



THE Type A-4 Section Insulator is sturdily built and so designed that the the entire trolley tension is sustained by two wood strain insulators in the same plane as the trolley wire. There is no buckling strain. The renewable fibre runner piece cannot warp. Rocker clamps hold the trolley wire firmly without damage.



BUILT for long life in heavy traffic, the the type ER Live Rigid Cross-Over is provided with a liberal metal thickness of pan and runner sections. This contributes also to its economical maintenance, making renewals few and far between. The cam tip approaches simplify installation and save time, minimizing delays and lowering costs. Can be furnished for a large number of angles.



A FEATURE of the type E-1 Live Adjustable Cross-Over is its combination brace and pull-off ring. This prevents buckling and insures long, care-free service. It also permits attaching a pull-off wire to hold another trolley wire in alignment. Interlocking malleable iron pan and cross runner castings are held together securely without screws or bolts.

Have Made Unrivaled Records, but—

so have other O-B Line Materials, all of which help to increase profits

ONE large city property saved $5,000 on trolley ears alone, the first year Marathon Ears were used. Even larger yearly savings are expected as additional Marathons are placed in service.

Twenty-one months of actual service, at the rate of 20,000 car passes per month, or more than 420,000 total, is the record established thus far on this property by Marathons.

This is three times the life of other trolley ears which were matched against Marathons in competitive tests. Even after 420,000 car passes, 50 per cent of the Marathons were still in use, and have not yet been removed.

Trolley Ear replacements have been reduced on this road from 1470 to 50 per month, replacements becoming fewer as Marathons are put into wider service. Line Breaks have been reduced from 331 to 188 per year, since using Marathons.

How much profit could you show in a year if 420,000 car passes was the service received per trolley ear? How much would you save in the labor cost of replacing worn out ears?

O-B Type BC Trolley Frogs furnish other examples of profit earning line material. One property reports a Type BC Frog that survived 652,000 car passes before it was removed from service. Another reports 524,000 car passes; another, 504,000. The lowest figure reported by five properties was 365,000 car passes. The average for five properties is close to the half million mark.

There are other facts and figures available which will show you how O-B Line Materials can increase the net profits of your company.

Isn't this a good time to send for these facts—to begin making similar records for *your* property?

Ohio Brass Company, Mansfield, Ohio
Dominion Insulator & Mfg. Co., Limited
Niagara Falls, Canada

103B

Ohio Brass Co.

PORCELAIN INSULATORS
LINE MATERIALS
RAIL BONDS
CAR EQUIPMENT
MINING MATERIALS
VALVES



Thirty buses of this type, operated by the Cleveland Railways, are equipped with Westinghouse Air Brakes

Modern buses should have WESTINGHOUSE AIR BRAKES

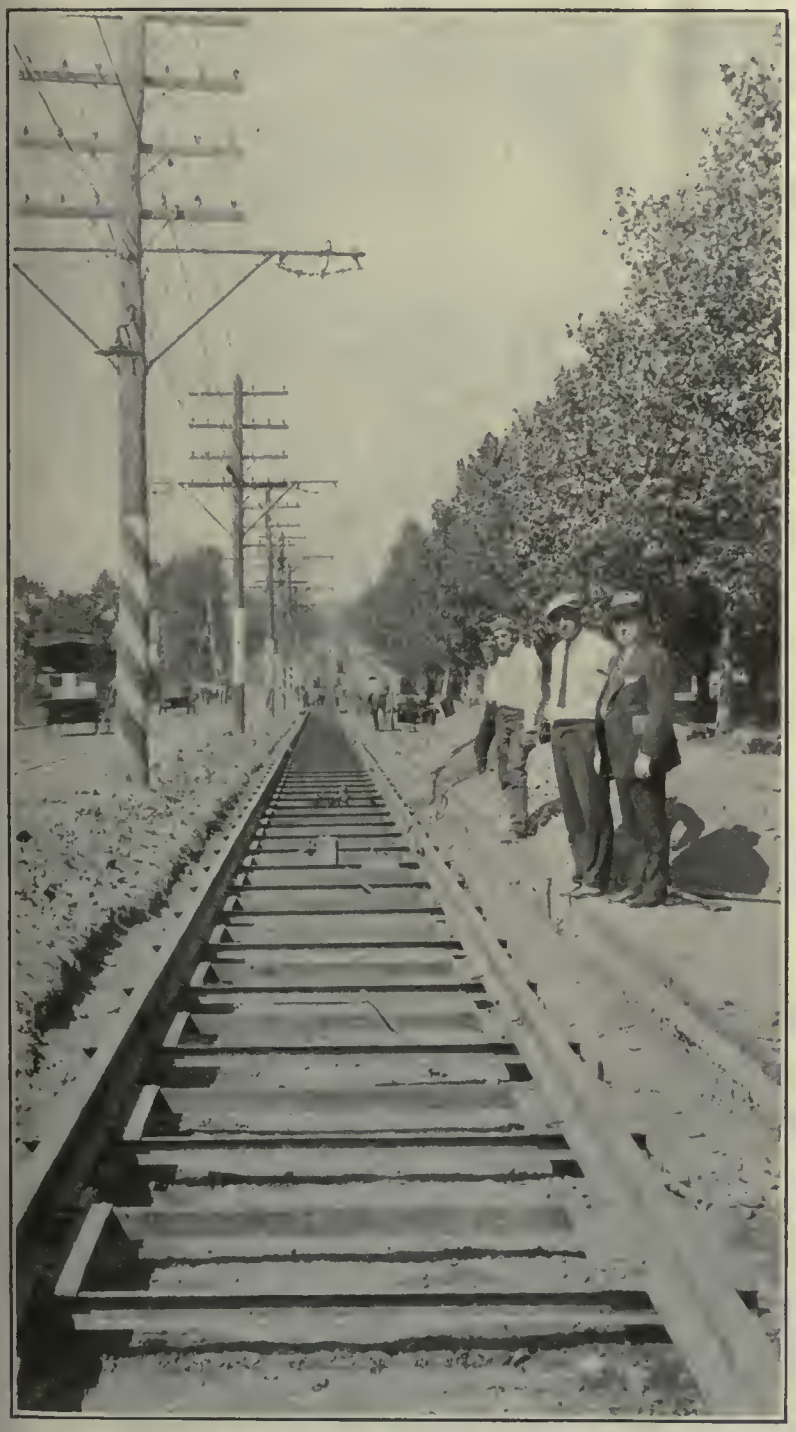
Westinghouse Air Brakes develop a retarding force sufficiently powerful for stopping even the heaviest bus quickly to increase safety and permit faster schedules—provide automatic equalization to minimize skidding and lengthen life of brake linings—relieve the driver of braking fatigue to increase safety and utility—and permit use of metal brake linings to provide still greater safety and economy.

Westinghouse Air Brakes provide the same element of control now safeguarding railway travel—are operating successfully on more than 2000 automotive vehicles under all conditions — receive Westinghouse service in all principal cities—are becoming increasingly popular with bus operators—and are being installed as standard factory equipment or on specification, by all leading automotive builders.

WESTINGHOUSE TRACTION BRAKE CO.
AUTOMOTIVE DIVISION
General Offices and Works, WILMERDING, PA.



Check steel tie construction with these essentials of good paved track—



BEARING—The efficient design of Steel Twin Ties provides 156 square inches of effective bearing per track-foot at the lowest cost per unit of bearing—and, where it is most needed, 468 sq. in. of bearing under each joint.

PERMANENT MATERIALS—In Steel Twin Tie construction, the tie structure embedded in concrete is not affected by water, temperature variations or rot.

ECONOMY—Steel Tie Track minimizes excavation, concrete and track labor. It costs no more than wood ties in rock ballast and its longer life decreases the cost per track-foot per year.

For estimating get the 1926 prices at your delivery point.

The International Steel Tie Company
Cleveland, Ohio

Steel Twin Tie Track

Renewable Track—Permanent Foundation

International Creosoted Ties

"The wooden tie—with reasons why!"



Shock Absorbing Car Tracks—

Resiliency

IMPACT is the implacable foe of track and paving. It can never be entirely prevented, but it may be cushioned, and wooden ties best accomplish it. The resiliency of wooden ties makes a smooth, easy-riding track for which there is no equivalent substitute.

And you can obtain wooden ties with a life of several times the ordinary untreated kind. The preservative effect of properly treating sound timber ties is exemplified in the established long-life records of ***International*** Creosoted Ties.

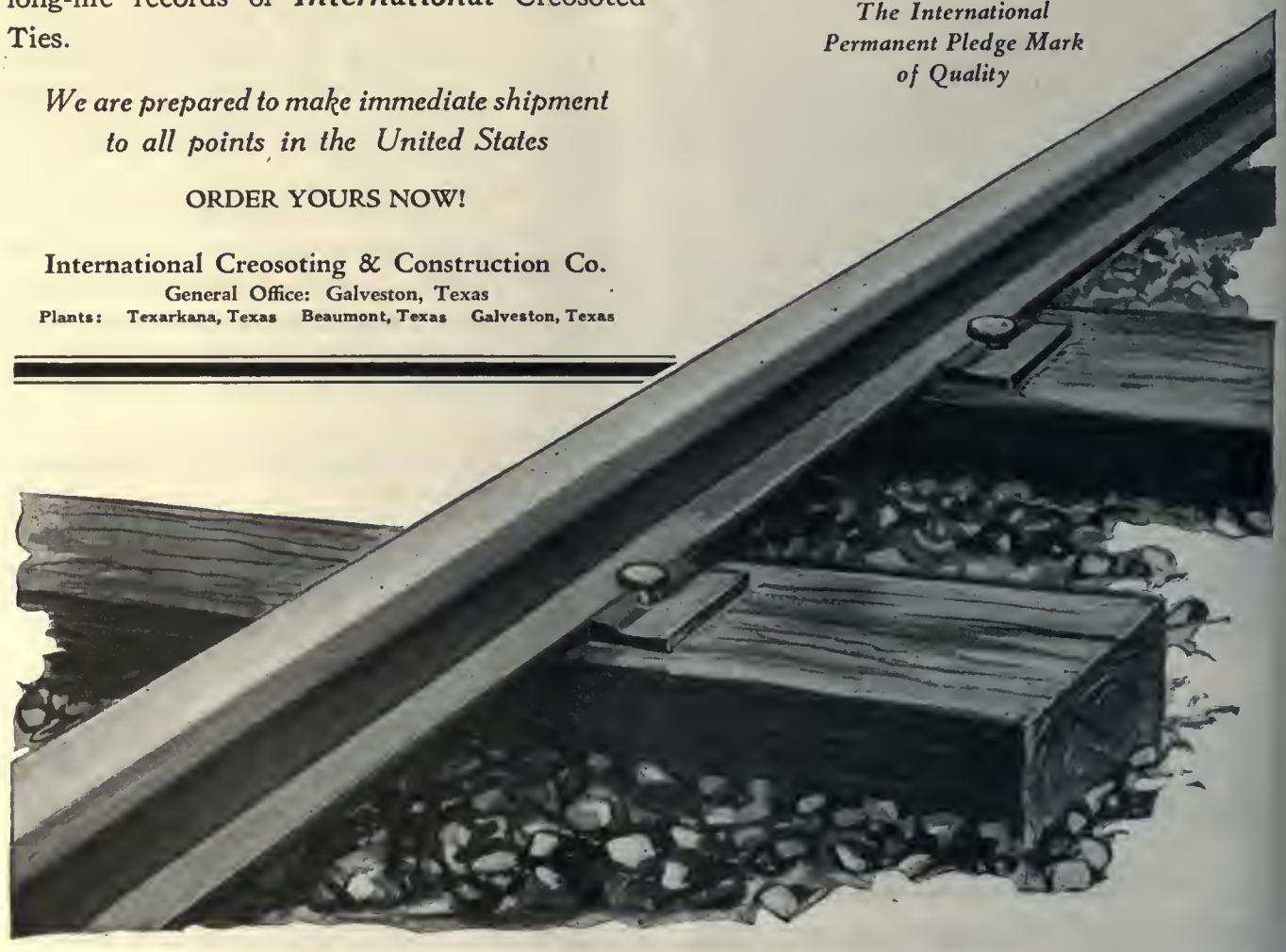
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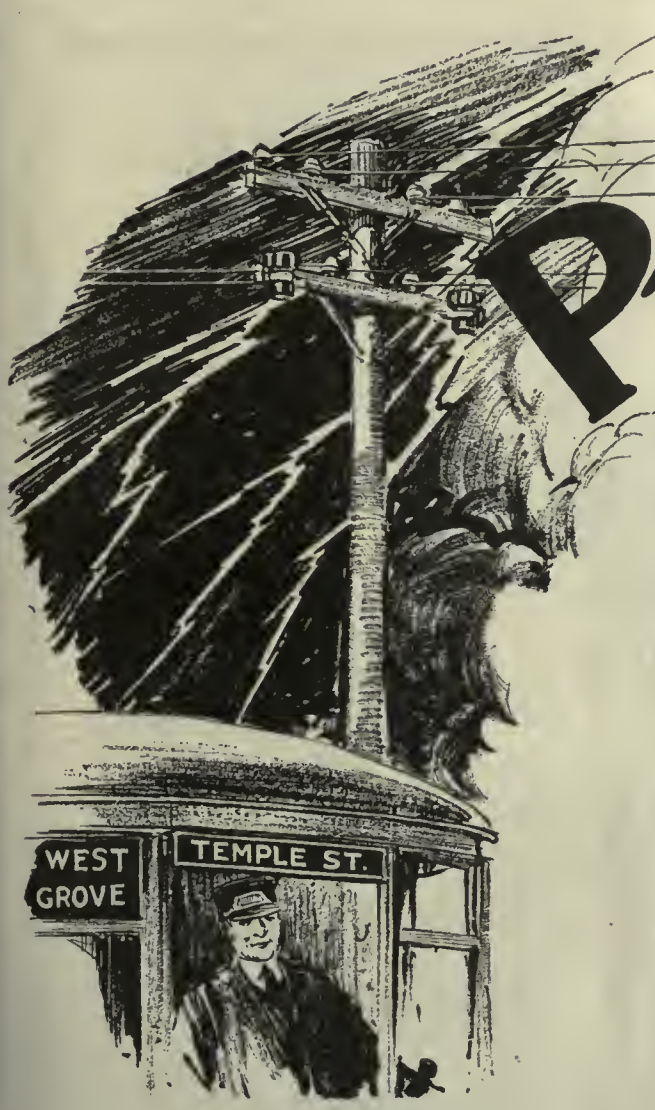
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International Creosoting & Construction Co.
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Protect—those new cars!

To protect the twenty-eight thousand new cars that will replace the obsolete ones now in service—install Keystone Type I C Lightning Arresters on cars and feeder lines.

Request full particulars

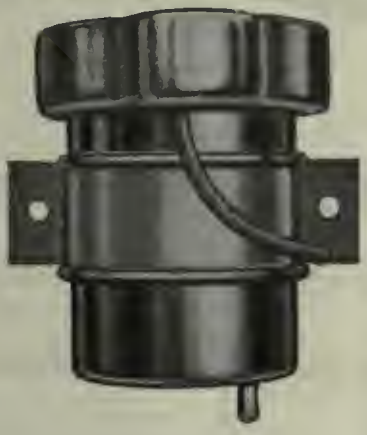
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KEYSTONE LIGHTNING ARRESTERS



Type I C Arrester

Self-contained.

Easily installed.

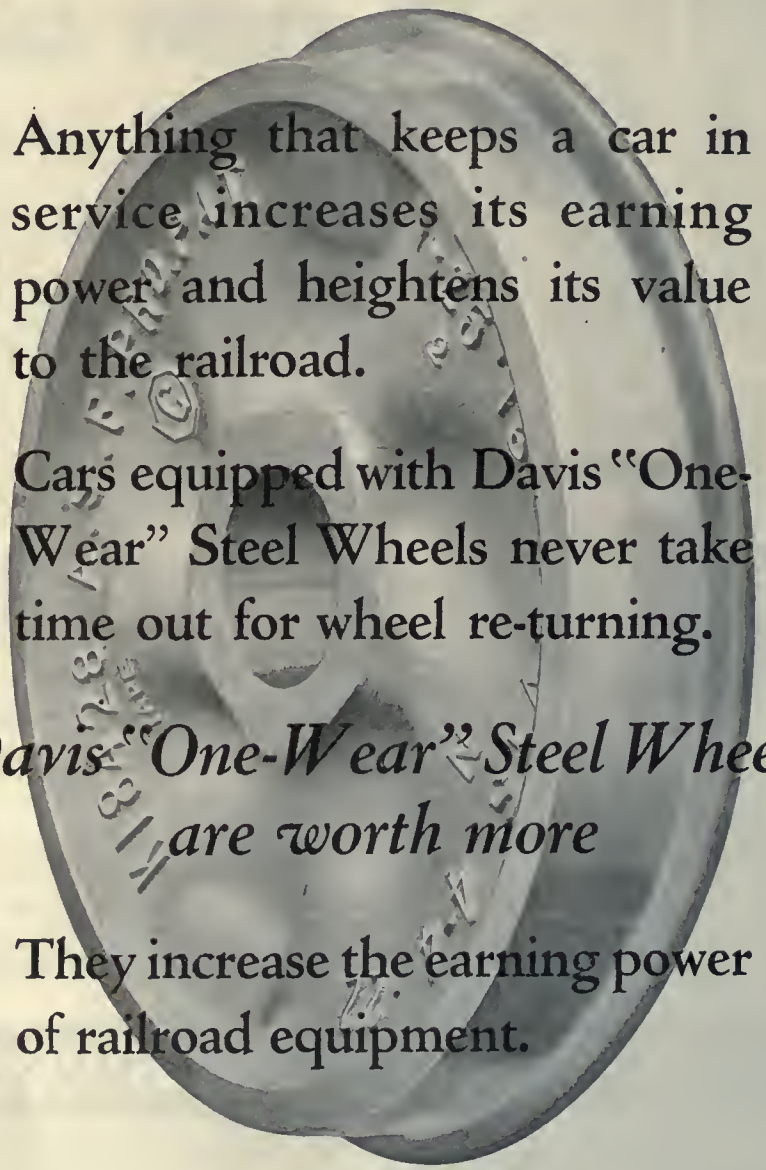
Small size makes them practical on crowded poles and in cars.

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Remarkably efficient.

MORE CAR HOURS



Anything that keeps a car in service increases its earning power and heightens its value to the railroad.

Cars equipped with Davis "One-Wear" Steel Wheels never take time out for wheel re-turning.

Davis "One-Wear" Steel Wheels are worth more

They increase the earning power of railroad equipment.

AMERICAN STEEL FOUNDRIES

NEW YORK CHICAGO ST. LOUIS



The **Banks** *of* **America**
stand behind **Yellow Coach**
transportation developments,

YELLOW KNIGHT



Consider the judgment of your Bankers —

Bankers do not give long term trust equipment notes on Yellow Coaches without reason.

It is not sufficient that they realize the stability of the motor coach as a means of transportation, strong as this assurance may be. They must, and *do*, go further by investigating the financial status of the manufacturing organization. They





weigh the protective value of personnel. They gauge moral responsibility toward the field. They measure experience in terms of service. They look ahead for years as a protection against "orphan equipment."

Two recent issues of long term trust equipment notes, amounting to millions of dollars, testify that banks are willing and genuinely interested in furthering Yellow Coach transportation developments.

Yellow Coach and General Motors, by combining their vast technical and manufacturing resources, experience and financial strength, have earned this tribute





paid them by the bankers of America. Such an alliance places *financial stability* behind the coaches you operate and wins the approval and co-operation of the most conservative bankers in extending the scope of Yellow Coach operations.

Your bankers know Yellow Coach and General Motors. They know the impregnable position held in the industry by these world leaders of automotive progress. And they know that present models are the result of twenty-five years of development work, carried on by men who pioneered the way.

Consider their judgment. Their viewpoint is an outstanding tribute to Yellow Coach.

YELLOW TRUCK & COACH MANUFACTURING COMPANY
SUBSIDIARY GENERAL MOTORS CORPORATION
5801 WEST DICKENS AVENUE, CHICAGO, ILL.



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The most even-tempered car man in the world cannot operate car doors and steps as courteously as the National Pneumatic Door and Step Controlling Mechanisms. Pneumatically operated doors cannot be banged or slammed. They *always* close or open with a gentle cushioned action which not only spares the temper of your passengers, but eliminates unnecessary wear and tear on your equipment. These facts are realized by the railway companies in San Diego and in many other modern cities where National Pneumatic Equipment is employed to insure constant courtesy in service.

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Executive Office, 50 Church Street, New York

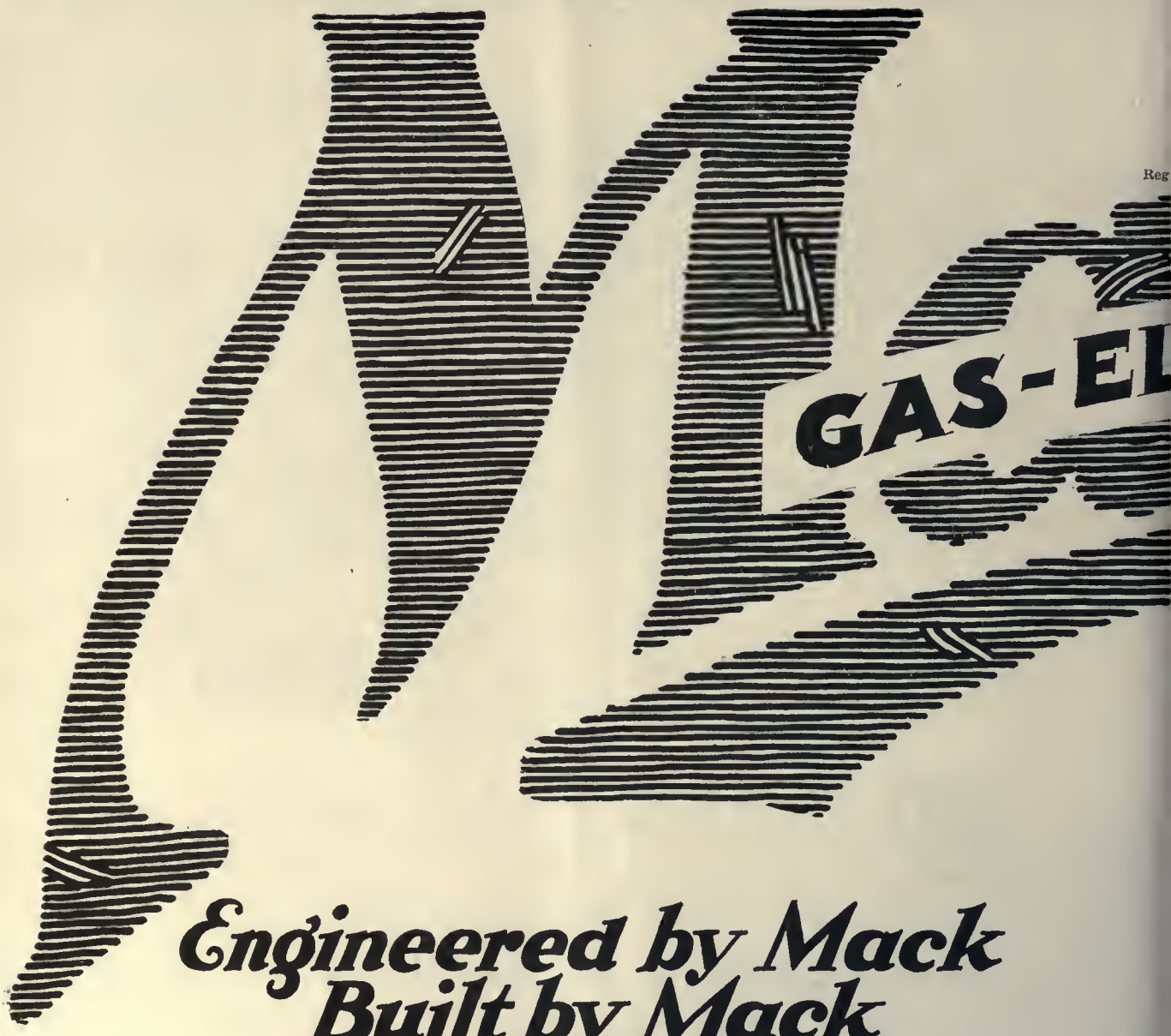
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Engineered by Mack
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Serviced by Mack—

Only after exhaustive tests, made under actual operating conditions, did Mack adopt one-motor drive as being the simplest and most economical in the long run, and on *your run.*

Retaining completely the many exclusive features and design of the standard Mack City-type Bus, the decision to stake the Mack reputation on one motor was based on the known advantages of one-motor drive to the operator.

One motor or two? Mack decided on one because *one motor does the job!* It insures the desired efficiency, at the same time reducing weight, care and maintenance charges. This being the case,—why two?

Mack uses a self-exciter generator and thereby eliminates the need of a separate exciter with its resultant added weight, care and service.

Simplicity has always been the keynote of Mack engineering. Mack has always designed and built with the viewpoint of reducing maintenance charges to a minimum, dispensing with non-essential units and retaining only those which are necessary to the exceptional performance upon which Mack reputation rests.

That's why Mack uses one-motor drive. That's why one-motor drive is most logical and economical. Same standard Mack chassis features. Same liberal road clearance.



TRIC -one-motor drive

MACK STANDARD FEATURES THROUGHOUT PLUS PERFECTED ELECTRIC UNITS

The Mack Gas-Electric One-Motor Bus is in chassis construction essentially the same reliable Mack, identical and interchangeable.

Thus the Mack Gas-Electric uses the standard dual reduction rear axle and single propeller drive for strength, quietness.

Complete power plant of engine, generator and motor mounted on Mack Rubber Shock Insulators, reducing vibration and noise to a minimum and adding years of life.

Mack's generator hook-up with the engine is through a rubber torsion insulator—(an exclusive Mack feature).

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Planned and built along rugged Mack lines, yet combining simplicity of design and great power and desired flexibility, Mack gives that simplicity of operation, acceleration and positive braking that traction men are accustomed to.

Get in touch with the Mack direct factory branch in your locality. Ride a Mack Gas-Electric One-Motor Bus. Put it to any test.

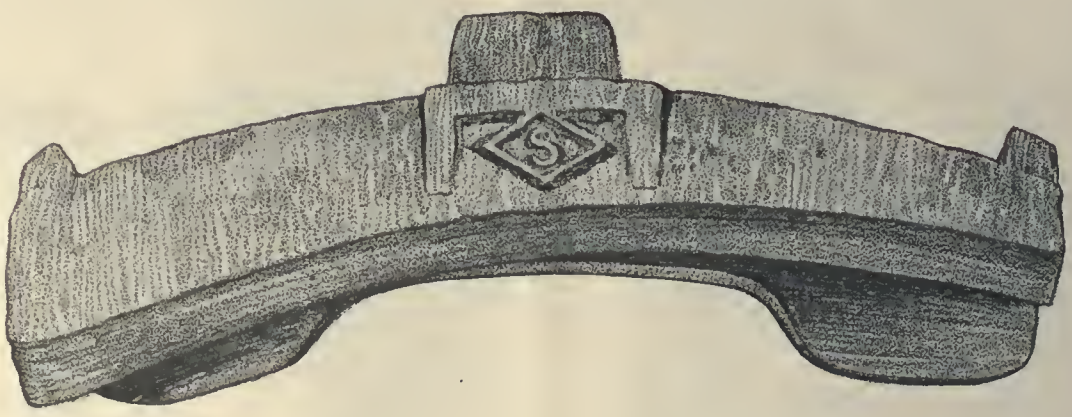
MACK TRUCKS, INC.
INTERNATIONAL MOTOR COMPANY
25 Broadway, New York City

One hundred and seven direct MACK factory branches operate under the titles of: "MACK MOTOR TRUCK COMPANY," "MACK-INTERNATIONAL MOTOR TRUCK CORPORATION," and "MACK TRUCKS OF CANADA, LTD."

The Mack Bus



A Mack Gas-Electric Bus in service. Note the generous ground clearance—9½ inches.



Should Brake Shoes Be Reversed?

IMPROPER rigging causes brake shoes to wear unevenly. An unevenly worn shoe must be reversed to give full service. This is particularly advisable in the case of an American Brake Shoe from which long work can be expected. Reversing brake shoes, however, is a continual expense. It is both cheaper and wiser to correct the faulty rigging, thus obtaining the full wear from every shoe without the trouble and expense of shoe reversal. Money is saved by using the best shoes. Why throw it away by continuing the use of worn brake rigging?

"Best by Test"

THE AMERICAN BRAKE SHOE AND FOUNDRY COMPANY

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Timkens in Gas-Electric Efficiency

In the very latest forms of rail transportation Timken Tapered Roller Bearings are a basic element. Naturally the new Brill gas-electric car for the New York, Ontario & Western—among the very largest cars of its kind—runs on Timken Bearings.

They enter so vitally into the economy records of the gas-electric type by relieving the journals of excess friction. Power is saved under way, of course, but Timkens still more favorably affect the starting characteristics.

Anti-friction advantages are available in such heavy service because highest capacity for thrust, shock and radial load is assured by Timken Tapered design, Timken-made electric steel, and Timken positively aligned rolls.

Even aside from saving of fuel, speeding up of schedules, and multiplied endurance, Timken Bearings are a major railroad economy because they require lubrication only a few times yearly!

On the rails the use of Timkens grows almost directly in proportion to the number of self-propelled cars, so widely have leading builders adopted Timken Tapered Roller Bearings.

THE TIMKEN ROLLER BEARING CO., CANTON, OHIO

TIMKEN *Tapered Roller* **BEARINGS**

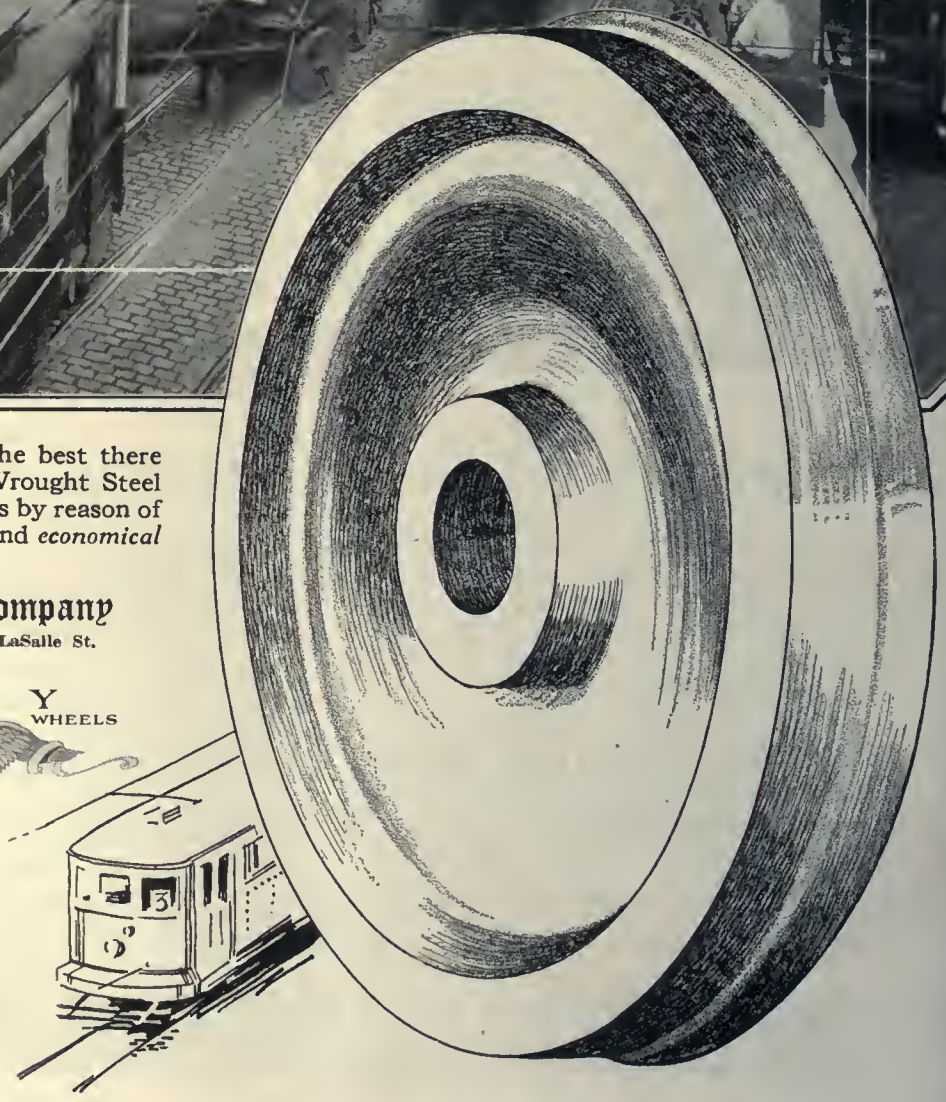


Modern traffic demands the best there is in equipment. Gary Wrought Steel Wheels meet these demands by reason of their *safety, dependability* and *economical mileage cost.*

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General Offices, 208 South LaSalle St.
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G A R Y
WROUGHT STEEL WHEELS





Build New Business *with New Cars*

IT IS a fact, demonstrated by the experience of numerous city railways, that a decided increase in patronage as well as a reduction in operating and maintenance costs invariably follows the adoption of new, attractive cars. This will be the experience of your property also.

Our engineering department will cooperate with you in working out designs and submitting proposals, or we will gladly quote on your plans and specifications.

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Successor to McGuire Cummings Mfg. Co.

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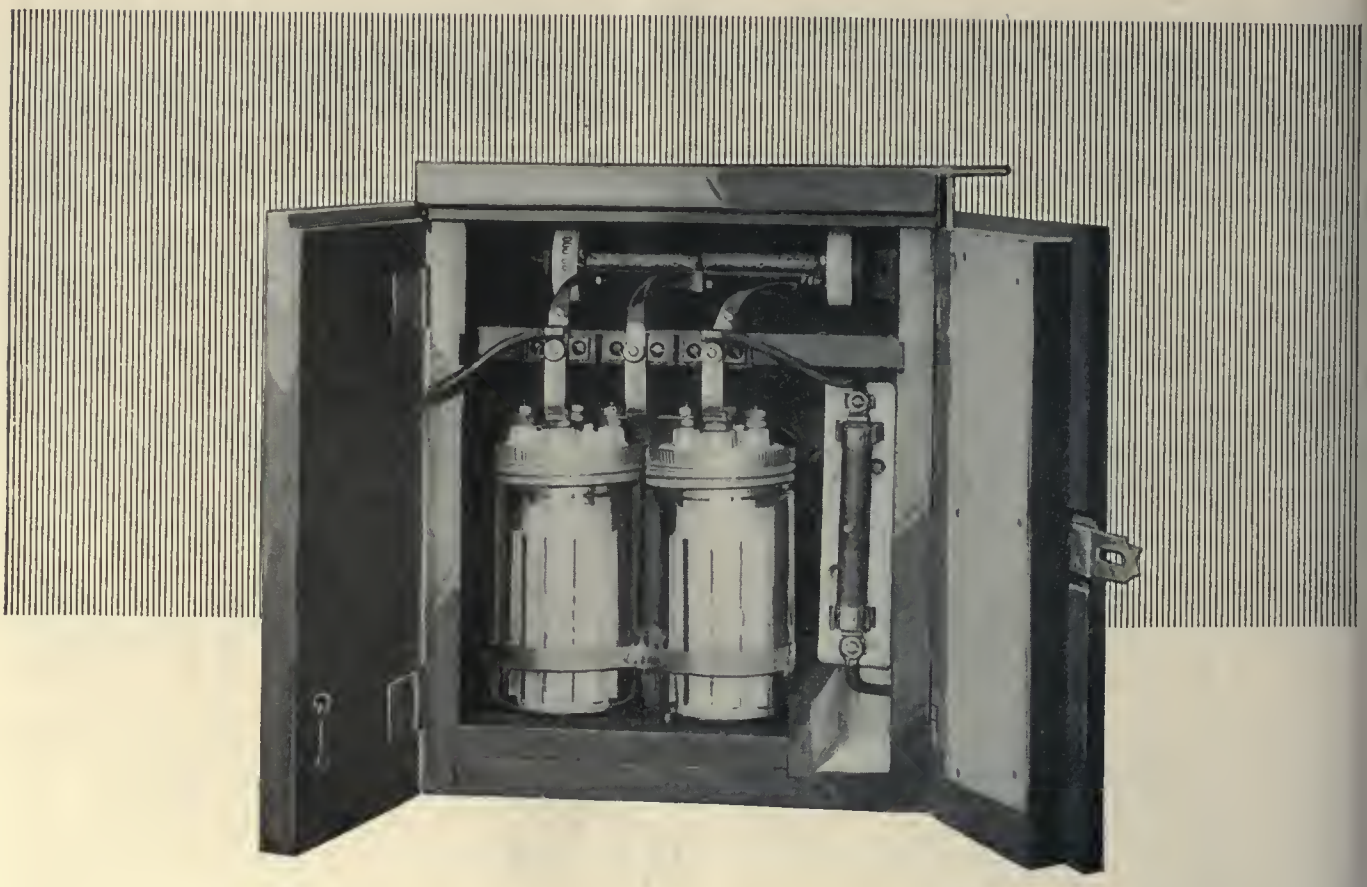


MC62 Low Car Body Truck

Light-Weight City and Interurban Cars

Lightweight Single and Double Trucks

Cummings Gas-Electric Motor Coach



Worthy of modern cars

The installation of D-C. Aluminum Arresters is right in line with the adoption of modern cars to reduce operating costs, because the record of this railway arrester in furnishing lightning protection is a record of cars kept out of the shop.

It is significant that south of the Mason-Dixon Line, where lightning storms are the most numerous, practically every electric railway has its equipment protected with arresters of this type.

The absolute protection afforded by the D-C. Aluminum Arrester is attested by roads where, with hundreds installed, not a single armature failure caused by lightning is experienced for years at a time.

No wonder that the confidence in this arrester is so enduring!

The D-C. Aluminum Arrester built by General Electric has the advantage of the most advanced facilities for research in lightning phenomena. It has the advantage of G-E experience with arresters for all other classes of service. It is the superlative arrester for the protection of car equipment.

442-1

GENERAL ELECTRIC

Electric Railway Journal

Consolidation of Street Railway Journal and Electric Railway Review

Published by McGraw-Hill Publishing Company, Inc.

CHARLES GORDON, *Editor*

Volume 67 New York, Saturday, June 12, 1926 *Number* 24

Mr. Nash Finds the Foundation Solid

DESPITE the growth of motor vehicle registration in the United States to approximately twenty million, and in the face of the unusual combination of difficulties produced by high operating costs on the one hand and limited income on the other, L. R. Nash, vice-president of the operating division of Stone & Webster, Inc., Boston, in an article in last week's issue of ELECTRIC RAILWAY JOURNAL declares that the $6,000,000,000 invested in the electric railway industry is in no danger of being wiped out. In fact, Mr. Nash maintains that the industry is just entering upon a new era of broadened activity and usefulness.

These views are based not on mere surface indications. They come from a man who is conservative in his viewpoint and a keen student and analyst of the fundamentals of utility operation.

Improvements in regulatory legislation and administration; development of fairer and sounder public thinking regarding the purposes and mechanism of local transportation franchises; a growing public appreciation of the unfairness of taxing car riders for the maintenance of paving to the profit of property owners; rapid crumbling of the barrier to progress represented by the fixed fare; a growing enlightenment regarding the proper basis for bringing about co-ordination of transportation service—these are among the more important underlying factors in the electric railway situation to which he calls attention. Although expressed in conservative language, Mr. Nash's summary of the situation is most encouraging. His facts are weighed with the careful precision of the scientist rather than played up for effect with the skill of the advocate. Mr. Nash dug down to fundamentals—and there he found the foundation solid.

Three-Phase Electrification Gives a Good Account of Itself

DISCUSSION of electrification in this country has sometimes indicated a tendency by some of those interested to become so absorbed in American conditions as to forget that progress has been made in other countries along lines quite similar to those here. While trainloads are considerably lighter in Europe, the use of the track is otherwise quite as intense as in America.

Last week an article appeared in this paper on the extension of the Austrian State Railways' electrified system in the Alps. This week an article is published giving the results of 25 years of electrification in Italy, a portion of which is just across the boundary from Austria. These are not minor installations. The Italian State Railways now operates or has under construction more than 1,000 miles of electrified trunk line railroad, and has in use or being built 686 electric locomotives totaling more than a million and a half horsepower.

Not a few Americans will be surprised to learn that the entire Italian electrification, save for a few experimental lines, has been carried out with the three-phase system. In this country three-phase operation has been counted out of consideration for many years. The Italian electrification has a mileage much greater than the longest American system. Continuous extension of the system indicates that it has given satisfaction under the conditions which are encountered in that country.

It is not to be inferred from the success of the three-phase system in Italy that it is suitable for use everywhere. It has its drawbacks, which the proponents of direct-current and single-phase operation are not slow to point out. But it cannot be gainsaid that in the situations where it has been employed it has given an account of itself which merits the attention of engineers whenever railroad electrification is discussed.

Wanted—A Railway at Its Best

BUSINESS grows through improvement of the product. Demand is built on desire. Saturation of the market for any product is overcome by tempting the customer through more attractive appearance, greater comfort and luxury, or, in the case of many products, improvement of the package in which the goods are sold. The automobile offers one of the most convincing illustrations of how effective is improvement of the product in stimulating buying demand.

The electric railway industry has been faced during recent years with what in some respects may be considered as a saturated market. Particularly in the smaller cities there has been experienced a serious recession in the demand for the product—street car rides. But at the same time the total demand for rides—for transportation—has increased at an astounding rate, largely due to the influence of the automobile. Under this same influence, also, the cost of transportation has been put on a new basis. Former standards have been entirely changed. There has come a widely expanded demand for quality in transportation. It remains for electric railways to improve their quality if they are to profit from the new market.

How can electric railway service be improved to meet the new conditions? The answer lies in the future. Attractive equipment, improved roadbed, speed, comfort, attention to the passenger—these are all factors in making a railway ride more marketable. Once the bounds of precedent are broken and the industry starts out seriously to exhaust the possibilities of improving service, then and only then will the limitations of the electric railway and the proper field for buses and other

forms of vehicles become clear. Curbstone transportation experts have been predicting the end of street cars and interurbans. They have judged electric railways as they found them, but they have judged not an industry which was functioning to the limit of its possibilities. Their conclusions have been based on performance after a long period of strangulation and starvation, caused by restrictive political bickering on the one hand and arbitrarily limited revenue on the other.

In the removal of franchise restrictions and in the growth of a more liberal attitude toward fares, underlying obstacles toward progress are being removed. This throws on railway management the responsibility for determining the limit of the improvements which can be made in equipment and performance. Under present conditions there are few examples which could be construed as electric railway service at its best.

The Action of King Canute Was No More Futile than This

STANDING beside the water and commanding the tide to recede, King Canute made a gesture no more futile than that of the trainmen of the Boston & Worcester Street Railway in their attempt to prevent the operation of buses by that company. They have brought a bill in equity to prevent the receiver from carrying out his intention of operating buses between Boston and Worcester. They contend that such a move would deprive many so-called "blue uniform" men of employment. This action indicates a viewpoint quite as distorted as that of the courtiers of the ancient monarch who were of the opinion that the sea could be controlled by royal edict. Apparently they lose sight of the fact that transportation service is furnished to meet a public demand rather than to provide jobs for railway trainmen. In reality, however, it is only by doing their part in making railway service attractive and sufficiently profitable to justify its existence that they exercise the slightest influence over fundamental economic laws.

According to the contention of the employees, an agreement has been in existence with the company for many years regarding wages, hours of labor and working conditions. This agreement, it is said, provides also that any new form of transportation not covered therein shall be dealt with in conference between the representatives of the men and the company. The men say that this has not been done. To what extent they may be justified in criticising the carrying out of the agreement is open to argument, but to seek to restrain the substitution of buses for cars on the ground that it jeopardizes their employment is a move almost as ridiculous as the famous attempt to control the tide. Electric railway trainmen have in their hands a power which is a large factor in making the service profitable or otherwise. The extent to which they enter into the spirit of merchandising transportation will determine the future of many railway properties. Therein lies the protection of their jobs. The doctrine of no responsibility by labor for the financial success of the enterprise in which it is engaged falls down when the enterprise is in danger of being wiped out. When the goose is dead, court action won't bring back the golden egg.

Double Fares Needed by Buses in Berlin

EVIDENCE accumulates that under present conditions of operating costs mass transportation in our large cities can be conducted more economically by electric cars running on track than by buses. In a communication in the issue of this paper for April 24 Wilhelm Pforr of the Berlin street railway system took occasion to deny the report that there was to be a city-wide replacement of trolley cars by buses in Berlin, and gave among his reasons for this statement that, in addition to increasing street congestion, buses would require double the fare to supply the same service. By a coincidence, Mr. Pforr's communication was received for publication and printed in the same issue as Mr. Loree's unfounded declaration at Kansas City that the $6,000,000,000 of investment in electric railways in this country could be wiped off the books because the electric car had become obsolete through the advent of the bus.

Mr. Pforr's statement that a city-wide bus system in Berlin would have to charge double the present trolley fare in that city may have seemed a little exaggerated to some people. Nevertheless, it has been strikingly confirmed by some analytical studies of the cost of operation in Berlin by trolley cars and buses recently made by Dr. E. Giese, professor of transportation in the leading technical Hochschule in Berlin, and published elsewhere in this issue. Under like conditions of taxation and loading, this expert finds that the cost per passenger-mile by buses, including interest and depreciation on the investment, is practically twice that of the electric car, so that the fare would have to be twice as much.

It cannot be charged that Doctor Giese's analysis is unduly favorable to the electric car. For purposes of comparison of cost per passenger-mile he took double-deck buses and single-deck cars, though he made some allowance for the non-use of the upper deck seats of the bus in winter, because of inclement weather. On a passenger-mile basis such a comparison certainly favors the bus, although it is obvious that double-deck buses (or cars) cannot make as good time on the streets as single-deck cars (or buses). In his operating cost figures also Doctor Giese assumes the use by the buses of solid tires instead of pneumatics.

The final result of this study was that if buses were running in Berlin today instead of street cars, on the same basis of passenger capacity, the public would have to pay some $26,000,000 more annually in fares. The author grimly adds that the Berlin public cannot afford any such "luxuries."

Of course, it does not follow that the Berlin figures apply in their entirety to the United States. Some of the items of expense of both car and bus would be different. The cost of fuel for the bus would probably be lower here, but it might well be that transportation wage cost, because of the smaller capacity of the bus, would be higher here, where the wages for platform men are much larger. Corresponding figures for typical American cities prepared by experts on railway and bus operation and based on actual performance would be very much worth while.

The need for such definite information is shown in the present discussion in New York City, where the municipal purchase of certain existing trolley lines is

being suggested so that these lines may be removed and the streets which they occupy "cleared for traffic." At the hearing on June 10 the Mayor was even quoted as saying, "I have heard of no one in public life or out of it that did not admit that the greatest cause of traffic congestion was the street car lines and that the greatest boon would be the elimination of these lines."

No one seems to consider that the buses which are being urged as a substitute for cars would themselves occupy a certain amount of street space. Whether the roadway area required per bus passenger actually would be greater or less than that per car passenger would depend on the types of vehicle under consideration. In actual practice such comparisons have always shown the street car to be a more economical user of street space than is the bus. Moreover, it is worth remembering that in London, where the buses are handling heavy traffic, their speed is much less than that of the tramways. In New York City itself the slow speed made by buses on Fifth Avenue is an example of what may be expected when these vehicles are used to handle heavy traffic on congested streets.

Unquestionably, there is a large field for the bus in this country, but it is a mistake to jeopardize its future by unwise attempts to substitute buses for electric cars at low fare levels. Neither considerations of economy nor traffic efficiency justify such a change.

Some People Deliberately Close Their Eyes to Economic Facts

BACK in the happy days before the World War it was possible for the residents of a certain suburban community to reach the business district of the adjacent town by street car for 5 cents. Rising costs gradually forced the fare up to 6 cents, 7 cents, and finally 8 cents. More recently the electric railway has revised its rates to permit a local ride in either community for 5 cents, while the cost of a through ride has become 10 cents.

Great is the indignation of a group of the suburbanites. A majority of them use the street car only twice a day, morning and night, but they are objecting vociferously to the increased fare which they have to pay. They have appealed unsuccessfully to the state regulatory body asking that the fare limit be abolished and the through rate restored to the original 5 cents. They have tried to boycott the street cars by extensive use of private automobiles. That attempt was not a marked success. They wished to establish a competing bus service which they hoped could be operated at a 5-cent fare, but found that such duplication of facilities was contrary to law.

Now they believe that a way out of the difficulty has been found. This group of people is considering the organization of a club and the purchase of a bus to take the club members to and from their work every day. By this subterfuge they would avoid the legal objection to the operation of competitive bus service. Because they do not all wish to go and come at exactly the same hour it would be necessary for the bus to make two trips in the morning and two trips in the evening. Hence it would be necessary to hire some one to operate it. During the middle of the day there would be nothing for the bus or its driver to do. Garage space would be required for its storage during those hours as well as for its protection at night. In other words, the club would have to organize a complete little transportation system of its own.

How such a transportation system with limited traffic in the rush hours and none at all during the day could be operated cheaper than the established agency is difficult to see. When, and if, the plan ever is put into effect, the members of the club are likely to have a rude awakening concerning the 5-cent fare. Just what will happen when their single bus must be overhauled or when it breaks down is a matter of conjecture. Probably they will be compelled to resort to the service of the old reliable street railway, which charges them 10 cents for a fast, safe, comfortable ride of several miles and provides service day and night, winter and summer, for all who wish to avail themselves of it.

No Longer Is a City a Single Focal Center

GROWTH of our cities has brought many changes in recent years, not the least important of which is the process of decentralization that has created numerous sub-centers instead of the former single focal center. Not so long ago the average city resembled a series of concentric circles with commerce and industry occupying the central zone while urban, suburban and rural residential districts were grouped around it. Gradually the business area expanded and encroached on the urban residential district. The latter spread outward into the suburbs and the net result was the creation of larger circles arranged in the same general way as before.

Now it has become evident that this method of development has certain serious disadvantages. It lengthens the average distance between home and place of employment, and multiplies the number of rush-hour users of transportation facilities. Congestion is vastly increased on the transit lines and on the streets. Great economic waste results from the alteration in the character of neighborhoods and the destruction of one set of buildings to make room for a new set, different in type, but not necessarily better. Utility services to meet the changed conditions can be provided only at high cost, and usually they lag far behind the demand.

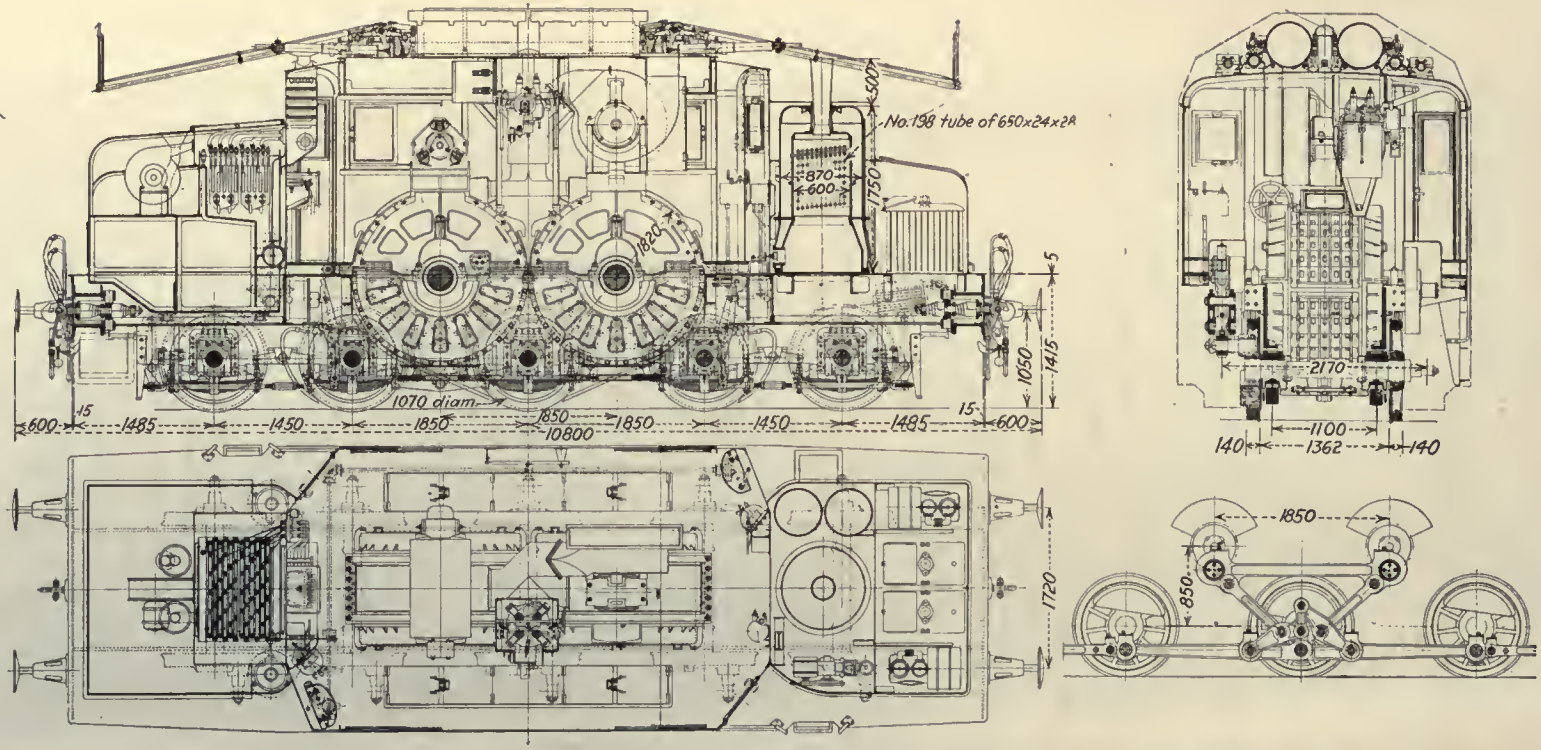
To offset these disadvantages it must be admitted that there is a certain gain in efficiency by geographical concentration of such business enterprises as require frequent contact with each other. If, for example, as the result of decentralization, every merchant had to travel 2 or 3 miles to see his banker, commerce and trade would soon be seriously hampered.

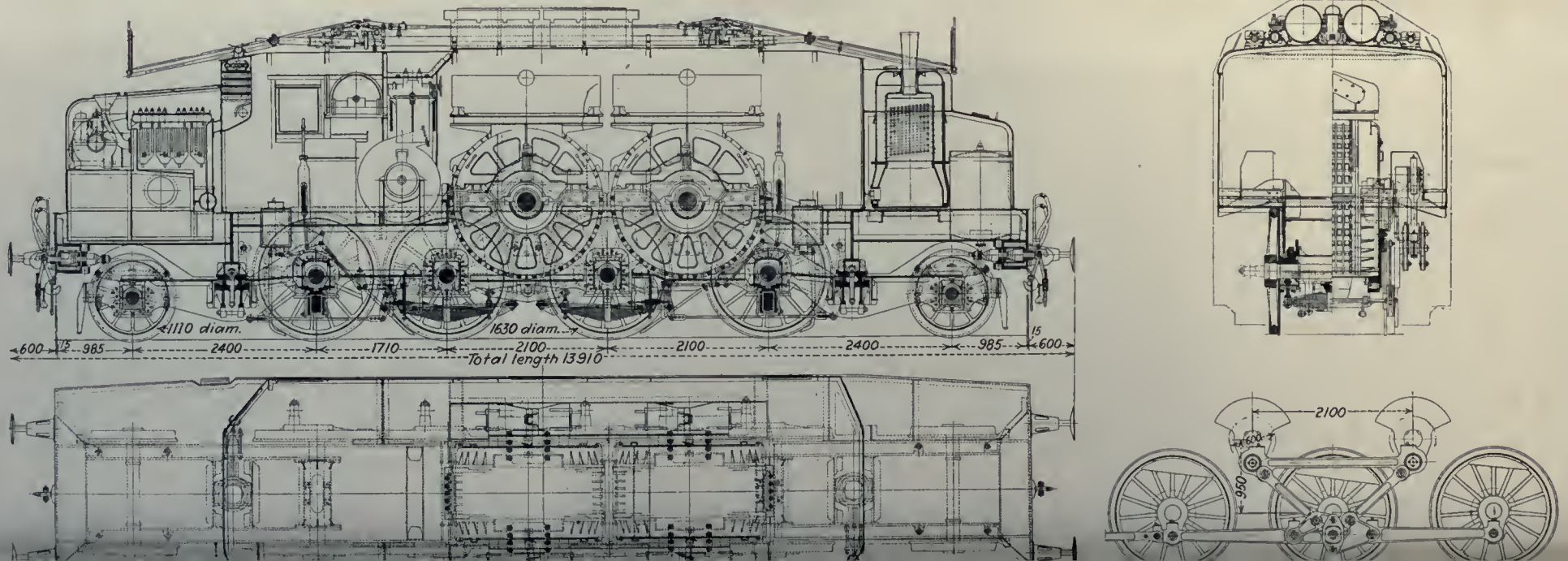
The problem, therefore, is so to arrange the city that those businesses and industries which need to be close together can enjoy that advantage, while those which can function equally well in other localities are distributed throughout the city with residential areas in between. It is clear that two things are necessary to accomplish this. A comprehensive civic plan must be prepared after thorough investigation of all the complicated details of the question. Municipal officials must have adequate legal authority to enforce the plan after it has been made up. Definite establishment of the character of a neighborhood may be anathema to the real estate speculator, but it is a real boon to the ordinary property owner, and will greatly facilitate the utility companies in providing adequate and satisfactory service.

Latest Developments in Three-Phase Locomotives for the Italian State Railways

At top, a new type of freight and passenger locomotive now under construction for mountain lines. A special type of side rods similar to those of the E-330 type is used.

Below, a new type of passenger locomotive under construction. Several improvements have been made over the E-331 type.





25 Years of Electric Operation in Italy

Three-Phase System Has Given a Good Account of Itself and Has Greatly Increased Capacity of Italian State Railways—System Is Being Extended and 3,000-Volt Direct-Current Lines Are Being Built Also

By Giuseppe Bianchi
Chief Mechanical Engineer Italian State Railways



The Lower Giovi Line Handles Heavy Freight. The 400-Ton Train Shown Is Ascending a 3.5 per Cent Grade at 31 M.p.H.

SINCE electric operation was first inaugurated on Italian steam railways in 1901, its use has been extended gradually but steadily until today 859.6 km. (533 miles) of line are in operation by electricity. In addition there are 836 km. (518 miles) of line in course of electrification. It is planned to extend the list of projected electrifications so that some 2,000 km. (1,250 miles) of main lines will be included. Conversion of these lines is a matter of great economic importance, since in addition to increasing the efficiency of operation it will make possible the use of large amounts of hydro-electric energy, thus greatly reducing the purchase of coal abroad, on which Italy is entirely dependent.

Installation of the first electric railway was suggested by a government commission in 1898; soon afterward experiments were started to try out the various systems of electric traction then available. In 1899 between Milan and Monza and between Bologna and San Felice self-propelled cars with accumulators were placed in service and in 1901 a third-rail system, similar to the ones which appeared at that time in America, was placed in operation between Milan and Varese.

On the Lecco-Colico-Sondrio and Colico-Chiavenna lines, however, it was decided to try an electric system which would permit heavy passenger and freight trains and would afford as regular service as the steam traction at a lower cost of operation.

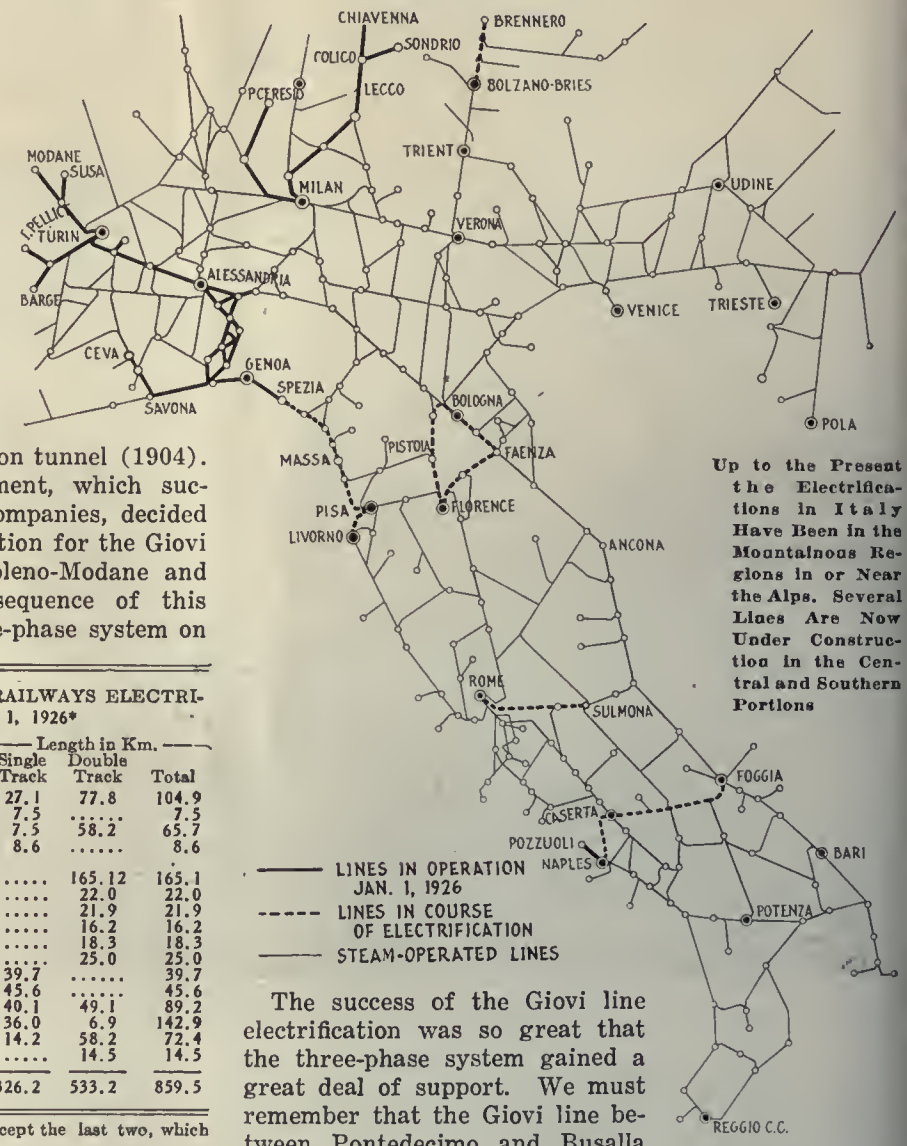
Although a heavy train service with a third-rail system had already been built in America (the Baltimore tunnel was electrified in 1895) at that time it was not believed that this system would be suited for a line 106 km. long with 2 per cent grades, so it was decided to use an alternating-current system of the type used on the Lugano street cars (1896) and the Burgdorf-Thun Railway (1898) in Switzerland. Instead of the 750 volts used on these lines, 3,000 volts was chosen, as results of experiments made at that time made it appear impossible to collect from a single trolley more than 300 amp., which would not have been enough for the 1,500 hp., 80 per cent power-factor locomotives which were necessary for hauling the trains planned for the Valtellina lines.

On account of the reactive effect and because at that time direct drive between motors and drivers was in use, the a.c. 16-cycle system was believed to be more suitable and therefore was adopted.

With the adoption of this system, a number of difficulties came up in connection with the speed regulation of the three-phase motors, the trolley and contact lines, the controllers, the mechanical transmission of power between the motors and drivers, the rheostats, etc. These all required a great deal of experimenting and study before they could be satisfactorily solved. The experiment, started in 1901, was, however, satisfactorily solved by the end of 1903. Up to that time the passenger service was handled by single motor car units.

In the year 1904 the first electric locomotives were put in service. These were of the 1-C-1 type, weighing 64 tons, with Scotch yoke drive from two motors with series-parallel connections, giving 32-64 km. per hour with 3,500-6,000 kg. tractive effort.

This type of locomotive gave such good results that the Swiss Government decided to adopt the three-phase system for electrification of the Simplon tunnel (1904). The Italian State Railway management, which succeeded the various private railway companies, decided to adopt the same system of electrification for the Giovi line and for the Savona-Ceva, Bussoleno-Modane and Bologna-Florence lines. As a consequence of this decision, an extensive use of the three-phase system on the Italian Railways began, which caused much discussion in the succeeding years. However, it must be remembered that at that time (1904) comparative data about the best system of electrification were not available as they are today. The single-phase system was then in its early development stages and the high-voltage d.c. system was not in existence.



Up to the Present the Electrifications in Italy Have Been in the Mountainous Regions in or Near the Alps. Several Lines Are Now Under Construction in the Central and Southern Portions

The success of the Giovi line electrification was so great that the three-phase system gained a great deal of support. We must remember that the Giovi line between Pontedecimo and Busalla has grades up to 3.5 per cent and the Giovi tunnel (3,258 m.) has a 2.9 per cent grade.

These steep grades made steam operation extremely difficult; with the best mountain steam locomotives (series 470, ten coupled, 75 tons on drivers) the trains hauled were: 170 tons with one locomotive at 25 km. per hour, 310 tons with two locomotives at 25 km. per hour, and 450 tons with three locomotives at 25 km. per hour.

TABLE I—LINES OF THE ITALIAN STATE RAILWAYS ELECTRICALLY OPERATED AS OF JAN. 1, 1926*

Line	Length in Km. Single Track	Double Track	Total
Modane—Bardonecchia—Bussoleno—Turin	27.1	77.8	104.9
Bussoleno—Susa	7.5	.....	7.5
Turin—Pinerolo—Bricherasio—Torre Pellice—Barge	7.5	58.2	65.7
Trofarello—Chieri	8.6	.....	8.6
Torino—Alessandria—Novi—Ronco—Genova (Via Busalla)	.....	165.12	165.1
Ronco (Via Mignanego)—Quadrivio Torbella	.....	22.0	22.0
Alessandria—Tortona	.....	21.9	21.9
Tortona—Voghera	.....	16.2	16.2
Tortona—Novi	.....	18.3	18.3
Tortona—Arquata Scrivia	.....	25.0	25.0
Sampierdarena—Savona	39.7	.....	39.7
Savona—Ceva	45.6	.....	45.6
Genoa—Spezia	40.1	49.1	89.2
Monza—Leeco—Colico—Sondrio—Chiavenna	136.0	6.9	142.9
*Milan—Rho—Gallarate—Porto Ceresio	14.2	58.2	72.4
*Naples—Pozzuoli	.....	14.5	14.5
Total	326.2	533.2	859.5

*All lines are three-phase, 16-cycle, 3,600-volt a.c. except the last two, which are 650 volts d.c.

TABLE III

Electric locomotives in operation on the Italian State Railways as of Jan. 1, 1926

Three-phase, 16-cycles, 3,600-volts Wheel Arrangement	Number
0—E—0	384
1—C—1	62
2—C—2	24
1—D—1	37
Total	507

*Three-phase, 45-cycles, 10,000-volts Wheel Arrangement	Number
0—E—0	4
1—D—1	24
Total	28

Direct current, 650-volts Wheel Arrangement	Number
B+B	1
C+C	5
1—C—1	10
Total	16

Electric locomotives under construction

Direct current, 3,000-volts Wheel Arrangement	Number
B+B+B	63

Direct current, 650-volts Wheel Arrangement	Number
1—C—1	20
C+C	12
Total	32

Three-phase, 16-cycles, 3,600-volts Wheel Arrangement	Number
0—5—0	26
1—D—1	14
Total	40

Grand total	551
Grand total	135
Total hp. of electric locomotives in operation	1,220,000
Total hp. of electric locomotives under construction	320,000
Total	1,540,000

*In service on 16-cycle lines.

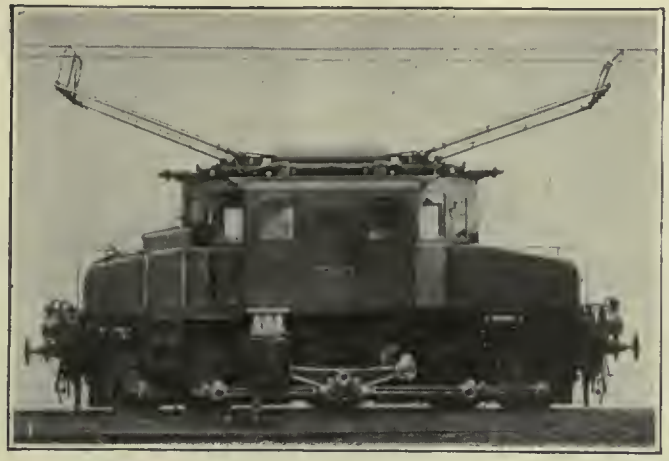
TABLE II—LINES OF THE ITALIAN STATE RAILWAYS IN COURSE OF ELECTRIFICATION

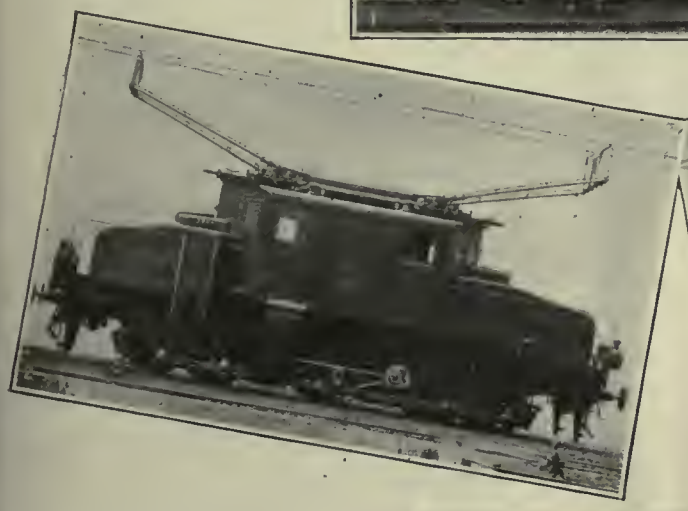
Line	Length in Km. Single Track	Double Track	Total	Type of Supply Phase	Cycles	Volts
Spezia—Pisa	...	75	75	3	16	3,600
Pisa—Livorno	...	19	19	3	16	3,600
Florence—Pistoia—Bologna	93	39	132	3	16	3,600
Rome—Avezzano—Sulmona	172	...	172	3	45	10,000
Benevento—Foggia	102	...	102		D.C.	3,000
Benevento—Caserta—Naples	97	...	97		D.C.	3,000
Florence—Faenza	101	...	101	3	16	3,600
Faenza—Bologna	...	49	49	3	16	3,600
Bolzano—Brennero	...	89	89	3	16	3,600
Total	565	271	836			

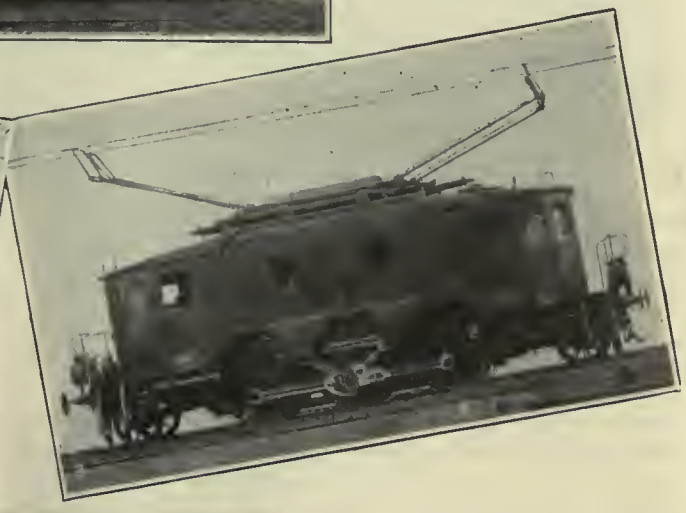
The weights of the trains hauled by the first Giovi electric locomotives (series E-550, ten coupled. 60 tons on drivers, 2,000 hp., of the type shown in Fig. 1, were: 260 tons with a single locomotive at 50 km. per hour, 470 tons with two locomotives at 50 km. per hour, 600 tons with three locomotives at 50 km. per hour.

By replacing the steam with electric operation on the Giovi line the following advantages were obtained:

1. The speed was doubled.
2. The distance between trains was shortened on account of more constant speed.
3. There was better utilization of the locomotives and crews.
4. Increased tonnage of trains was obtained.







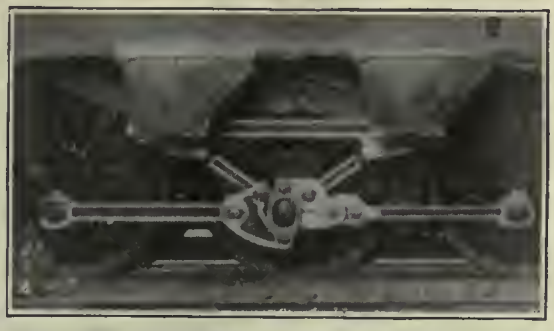
Typical Locomotives of Italian State Railways

All are three-phase, 3,500-volt machines

1. Type E-550 locomotive, of which 185 were built between 1911 and 1917. They weigh 64 tons, all on drivers, and have a rating of 2,000 hp. at speeds of 25/50 km. per hour (15.5/31 m.p.h.).

2. This locomotive is similar to the E-550 type but is more powerful, being rated at 2,000 kw., the weight being 74 tons. Between 1920 and 1925, 186 of these were built.

3. Type E-330 is a four-speed passenger locomotive rated at 2,000 kw. Sixteen of these are now operating. The speeds are 37-50-75-100 km. per hour (23.3-31-46.5-62 m.p.h.).



4. Detail of the articulated drive of the E-330 locomotive shown in No. 3.

5. Passenger locomotive type E-431, rated 2,000 kw. with four speeds similar to the E-330 type. Of this type 37 were built between 1920 and 1924 and are in service between Genoa and Turin.

6. Type E-331 locomotive. This is a recent design with the same electrical characteristics as the E-330 type.

7. A passenger locomotive designed for 45 cycles, 10,000 volts. The apparatus is nearly the same as on the 16-cycle machines, but there are in addition line transformers and a gear reduction is provided between the motors and the auxiliary axles.









On the Upper Giovi Line. A 350-Ton Passenger Train Is Going up a 2 per Cent Grade at 47 M.p.H.

5. There was greater regularity and safety for trains going down the grades, as the regeneration of current allowed them to go down without brakes, with the result of reducing wear on wheels or rails.

6. The coal consumption, which in steam operation was about 86 grams per virtual ton-kilometer, was reduced to 50 grams at the electric generating plant.

Electrification of the Giovi line was regarded as the most satisfactory solution for mountainous railway operation with steep grades and heavy traffic. The Italian State Railways in 1911 decided to apply the same system of electrification to the following lines: Bussoleno - Modane, Savona - Ceva, Sampierdarena - Ronco, Monza-Lecco, Turin-Pinerolo, Sampierdarena-Savona.

In 1915, on account of the war, all work for the new electrifications was suspended. The enormous difficulties of steam railway operation in Italy during the war period, owing to the deficiency and bad quality of coal (the price of which reached 500 lire, or $20 per ton) were very serious and pointed out the advisability of a careful study. Coal saving on the 435 km. (272 miles) of electrified lines up to 1918 was about 170,000 tons per year, corresponding to 85,000,000 lire ($3,400,000).

The question of which would be the best system for use on the new lines to be electrified was largely discussed and the advisability of using power from the existing plants and the great progress made by the d.c. 3,000-volt electrification system suggested a tryout with a 42 or 50-cycle, 10,000-volt, three-phase system and with a d.c. 3,000-volt system.

Table I gives the lines electrically operated in Italy as of Jan. 1, 1926; Table II gives the lines in course of electrification, and the map indicates the location of the above lines; Table III shows the number and types of electric locomotives in service and under construction as of Jan. 1, 1926.

Operating expenses of the 15,625 km. (9,800 miles) of steam railway and of 631 km. (394 miles) (for the Piedmont and Liguria regions) electrically operated lines for the year 1924-1925 are shown in Table IV.

The unit used in these tables is virtual ton-kilometer. This unit was obtained from the following formula:

$$L_v = L_r + \frac{h + \Sigma pl}{5}$$

where

L_v = virtual length in kilometers.
L_r = real length in kilometers.
h = difference of level in meters between two points
l = length of curves in kilometers.
p = coefficient of the radius of the curve.

The p coefficient assumes the following values:

Radius of curve in meters	1,000	900	800	700	600	500	450
Values of p	0.5	0.6	0.8	1.0	1.2	1.5	1.7
Radius of curve in meters	400	350	300	250	200	180	..
Values of p	2.0	2.4	2.8	3.4	4.2	4.5	..

These virtual ton-kilometer units which have been used by the Italian railway companies since 1880, while they provide a measure of work done on the steam operated railroads, do not take into consideration the energy returned to the system by electrically operated railway trains when regeneration is used on down grade runs.

From the data of Table IV the economic possibilities of electric railway operation in Italy may easily be seen.

TABLE IV—COST OF STEAM OPERATED (15,626 KM.) AND ELECTRIC OPERATED (630 KM.—PIEDMONT AND LIGURIA REGIONS ONLY) LINES DURING PERIOD JUNE, 1924, TO JUNE, 1925

STEAM	Real run of locomotive, train kilometer	134,986,121
	Real run of locomotive switching, hours	3,979,197
	Real run of hauled axles, kilometer	4,445,000,000
	Hauled ton—kilometer: virtual, kilometer	45,180,632,300
	Hauled ton—kilometer: real, kilometer	35,105,386,400

ELECTRIC	Real run of engine, train kilometer	11,175,193
	Real run of engine switching, hours	37,976
	Real run of hauled axles, kilometer	429,161,000
	Hauled ton—kilometer: virtual, kilometer	5,044,547,000
	Hauled ton—kilometer: real, kilometer	3,384,394,900

	Cost in Lire		Cost per Ton-Km.	
	Total	Axle-Kilometer	Virtual	Real
Personnel	418,016,459	0.07895	0.00777	0.01000
Fuel	545,647,602	0.11114	0.01093	0.014 7
Oil	15,722,296	0.003 8	0.00030	0.00039
Maintenance	269,593,515	0.05397	0.00531	0.00683
Pumping plants and water	6,414,182	0.00130	0.00013	0.00016
Interest and depreciation charges	87,002,000	0.01865	0.00183	0.00236
Total	1,342,396,054	0.26709	0.02627	0.03381

	Cost in Lire		Cost per Ton-Km.	
	Total	Axle-Kilometer	Virtual	Real
Personnel	41,747,632	0.09272	0.00789	0.01175
Oil	1,269,432	0.00292	0.00025	0.00037
Maintenance: Locomotives	11,346,147	0.02602	0.00221	0.00330
Maintenance: Electric plants	2,898,900	0.00656	0.00056	0.00083
Interest and depreciation charges	61,580,578	0.13982	0.01190	0.01773
Electric energy	13,482,590	0.03057	0.00260	0.00388
.....	.....	.....	.....	.....
Total	131,325,279	0.29861	0.02541	0.03786

The cost for a traffic unit, that is to say one virtual-ton-kilometer, for the electrically operated lines is less than for the steam operated lines. The cost of coal in Italy is now between 180 and 200 lire ($7.20 to $8) per metric ton, while the average cost of electric energy for railway purpose last year was only 0.13 lire (0.52 cent) per kilowatt-hour.

The cost for transmission lines, substations and feeders, is about 500,000 lire ($20,000) for each kilometer of a double-track line, and the cost of an electric locomotive for passenger traffic (2,000 kw., 90 tons) is about 1,400,000 lire ($55,000).

These conditions are most favorable for electric railway operation, and a study for a more extensive electrification is now under consideration.

It is worth while to point out that the electrification of about 2,000 km. of main lines which are now steam operated will reduce by 40 per cent the present coal consumption for railway use which totals about 2,500,000 tons per year. This reduction in coal consumption will be of great importance due to the scarcity of coal in Italy.

It is not possible to state at this time how many years it will take for the full realization of this program, as it mainly depends on how soon the new hydro-electric plants can be built. However, from the results so far obtained by the operation of electric lines and the improvements which are continually introduced it may confidently be said that the most efficient and economical way to solve the problem of transportation in Italy lies in this direction.

Beaver Valley Enters the World of Art

Louis Hake, Master Car Painter, Pictures the Spirit of Local Industries on the Sides of a Street Car, Which Is Now in Service

EVER quick to seize upon a new idea in public relations work the Beaver Valley Traction Company, New Brighton, Pa., has made a clever tie-in with the industries which form the backbone of Beaver Valley enterprise. Having a car painter who is a master craftsman with the soul of an artist, it was a comparatively easy task to work the plan out.

One of the company's double-truck cars was subjected to an intensive process of exterior and interior decoration, the purpose of which was to show the varied



The Invaluable Aid of the Newspapers Was Not Forgotten

nature of the industrial life of the several communities served by the traction company. On each end appears a map of the trolley and bus lines; beside each of these is a pair of eyes within an outline map of the United States. These lend color to the inscription "The Eyes of the Nation Are on the Beaver Valley." And color plays an important part in the *tout ensemble* of the car. Each of the inscriptions on the sides and ends of the traveling good-will builder carries a distinct message regarding some line of industry which provides employment for Beaver Valley citizens. For the most part the actual names of particular companies are not given, as in many cases there are two or more concerns engaged in the line of work depicted.

While other sections of the country might be inclined to dispute some of the claims made for the charms of Beaver Valley, certainly no one within the valley itself may be expected to be other than highly pleased. The slogan in the center of each side of the car provides an appeal to industry in general to locate in Beaver Valley. "Where the Sun of Prosperity Always Shines."



Probably the Masterpiece of the Entire Gallery Was That Appearing at the Extreme Right Picturing the Brawny Steel Handlers at Work

Other units in the general scheme of design illustrate successfully the products of the steel and iron plants, glassware, chinaware, sanitary ware, art tile, mill work, cork products, bridgework, clay products, drilling machinery, wallpaper, nails and rivets, electric power and transportation and the local newspapers.

A slogan at the top of one side blazons forth the words "Industry, Transportation, Citizenship," the three most important phases of community life in the estimation of the Beaver Valley officials. At the top of the other side appears the phrase, "A County with Ninety Different Products." Naturally it was impossible to feature all of these products at the first showing of the car, so it is planned to withdraw it from service occasionally and replace some of the present designs with new ones.

The car went in service on May 5 and will be operated over the entire system of the company. Thus each of the ten communities served by the trolley lines will be given an opportunity to expand with local pride as the car appears within its environs. And well may Louis Hake, creator of a new school of industrial art, the designer of the first multi-pictured street car, expand also with pride as he listens to the plaudits of the local papers and leading citizens. All of his designs were good, but the gem of the collection was the scene depicting the brawny steel workers following the ancient rites of Vulcan. Across the top in a scroll appeared the words "He Who Toils Here Hath Set His Mark." So accurately had the artist portrayed the scene that the heat could fairly be felt to emanate from the white hot steel in the ladle. To paint life-like human figures in natural colors on the exterior of a street car is no piddling task.

Prior to placing the car in service the railway had placed a series of "Just Smile" cards in the cars, these being varied with more serious messages concerning the service of industry and transportation. Details on these were published in the JOURNAL for April 24.

Nothing has been asked from the local industries in return for the unsolicited boosting which they receive from the use of the cards and the decorated car. Clinton D. Smith, general manager of the company, believes that what redounds to the credit of the valley as a whole will prove of just as great, albeit somewhat more indirect, value to the railway. And he is gaining friends among the local interests which may be inestimably helpful, should the day arrive when the company wishes to enlist the support of its friends and patrons for an increase in fare or a sweeping reorganization of transportation service.

In Commemoration of Easton's Railway

A BEAUTIFUL bronze tablet, 16 in. x 24 in., has been placed on one of the tiers near the south entrance to the Bushkill Bridge, Easton, Pa., commemorating the building by the Lafayette Traction Company of the third electric railway in the United States and the first electric railway in the city of Easton. This line, now a part of the Easton Transit Company's system, ran from Centre Square to College Hill, and its building, which was completed Jan. 14, 1888, was bitterly opposed by residents of North Third Street, who objected to the planting of poles. The marker was paid for and presented by former Mayor David W. Nevin, who was secretary and treasurer of the Lafayette Traction Company.

Subsidized Bus Lines in Houston Serve Recently Established Suburbs

DUE to the ship channel making Houston, Tex., a deep water port, as well as other causes common to the great Southwest development, this city has experienced an unusual expansion. This growth has expressed itself in part by extensive real estate developments from 3 to 5 miles out from the center of the city and remote from any form of transportation except the automobile. Naturally enough the real estate developers have realized the importance of common carrier transportation. The Houston Electric Company, operator of the local transportation system, was naturally unwilling to add unprofitable lines in order to develop new territory.

The compromise made was a contract between the real estate operators and the railway by which the company operates the bus service and the real estate operators agree to pay all costs, including the per car-mile operating charges and a proportion of depreciation, fixed charges, taxes and license fees each month. All revenue is credited, so that in reality the realtors pay only the deficit. The company, however, buys the bus equipment and hence contributes its full part by financing the project.

The contract provides that the Houston Electric Company may take over the operation at any time that it so elects, and agrees to take it over whenever the gross receipts shall show a surplus over all expenses for a period of six months. Any surpluses made during individual months are credited to the realtors subsidizing the project. As there is no state regulation in Texas, permits to operate must be obtained from the city. The company protects itself by getting permits only from year to year, each renewal being based on the mutual desire to continue the contract for another year.

At present there are four of these subsidized lines running from outlying points to the center of the city. One feature of interest is that these lines are operated express from the outlying district to the city center so that a faster service to these communities is being furnished. At the same time there is no conflict with existing car and bus lines that may be paralleled for a distance near the city center. A 10-cent fare is also charged on all such lines with transfer privilege to and from cars. The over-all costs of these express lines are from 26 to 28 cents per bus-mile. Gross business of the lines is gradually increasing and varies between 15 to 18 cents per mile, so that the deficits are not large, because comparatively infrequent service is offered.

All buses operated in this manner are clearly marked so that the patrons know that the line is not necessarily permanent and depends on the subsidy of the development company named in each case. This somewhat temporary feature is recognized and has a certain effect on land purchases. The general belief is that the line will eventually become a paying proposition and become permanent and that the subsidy will last until this point is reached.

The Houston Electric operators are about to start six other bus lines in conjunction with their regular car service. Three of these lines serve new territory and two lines are feeders. Generally on the regular bus lines the fare charged is 7 cents cash and four tokens for 25 cents, except that when a line is operated to give express service the fare that is charged is 10 cents cash.



Electric Cars, Automobiles, Teams and Pedestrians Need Every Inch of Room There Is on the Downtown Streets in Atlanta

Maintaining the Morale in Atlanta

Transportation Men Encouraged to Neatness by Free Shoe Shines and Clothes Pressing at Carhouse—Suggestion Box and Full-Length Mirrors in Trainmen's Headquarters—Social Clubs, Safety Work, Credit Union and Other Activities Among the Employees

VERY trim in appearance are the trainmen in Atlanta. A great deal of stress is laid on the need for neatness by the Georgia Railway & Power Company. The men are encouraged to maintain this standard of appearance by being able to have their clothes pressed and their shoes shined free of charge at any carhouse of the company. There is also a full-length mirror in every division headquarters for the use of platform men. Above this mirror are the words: "Look at yourself and see if you properly represent your company." Besides his regulation uniform, every platform man is required to wear a white shirt, white linen collar and a four-in-hand tie while on duty.

Adjoining the mirror in the transportation headquarters is a box in which the trainmen are invited to deposit suggestions for the improvement of the service. Many good ideas are obtained in this way, particularly on the arrangement of schedules. Every suggestion is considered and is answered, usually by the superintendent of the division with which the man is connected.

On the line of route are several boxes in which conductors deposit envelopes containing the transfers collected on each round trip. These envelopes, one of which is illustrated, are collected once an hour by the auditing department. The auditing work is continued all day. The purpose of the plan is to make conductors more careful in the collection of transfers.

To help the men keep their cars on time a blueprinted time-table of his particular run is posted in front of every motorman or one-man car operator. It is held in a frame carried under the hood.

Within the organization there are several social or recreation clubs. One is the Power Club, to which all employees of the company are eligible. This club has the use of some very attractive camping grounds about 60 miles from Atlanta, on which there are 25 or more housekeeping and other cottages. These recreation grounds are used extensively by the men and their families during the summer.

In addition, there is a social club, with women's auxiliary. This club is especially for the transportation men and has its headquarters in transportation headquarters on Piedmont Avenue. Dances are given twice a week, and the clubroom has other means of recreation like pool, basketball, radio and a stage for the presentation of any entertainment during these programs. The dues of this club are $1 initiation and 50 cents a month.

Adjoining the clubrooms in the main transportation building on Piedmont Avenue are the offices of the company doctor and dentist. Medical attention by the doctor is free to any employee and his family, and the dentist's charges are much less than those of an outside dentist.

During the past eighteen months the company has devoted a great deal of attention to the reduction of accidents, and in March, 1925, a safety council to represent all departments of the company, light and power, as well as the railway, was appointed. The Safety Council is made up of the department head or other real representative of each department. In addition, each department has at least one safety committee.

In the railway department there is a safety committee for each carhouse, track gang and line gang. The rule of rotation of membership is followed in each committee, each member serving three months, then being replaced by another, so that eventually all will serve. The number of the members in each committee varies according to the size of the gang or division. Most committees have regular meetings. Usually the road gang committee meets on rainy days, the carhouse committees in the evening, and the linemen twice a month on Saturdays.

In addition to the division committees mentioned, there is a large committee known as the first aid committee, whose duty it is to spread information about what to do in case of accidents. Through this committee a class of 27 employees from all departments was formed and received the standard Red Cross first aid instructions, so that all have now first aid committees. These men are now giving instructions to other employees, so that all will have a knowledge of first aid work. All those employees whose duties require them to work near high-voltage apparatus receive special instructions in the prone pressure method of resuscitation.



Traffic at Most Congested Crossings Is Now Controlled by Light Signals

Each department makes a report to the main safety committee each month, showing the number of man-hours of work, the number of man-hours lost for any reason, the number of accidents for the department and the cause of each accident. Every accident is investigated.

Since this campaign was started the total number of accidents to employees has been reduced 25 per cent. This is considered proof that the campaign is effective.

In the railway department every accident in which an employee is involved is discussed with him, whether he is responsible or not. There is also a talk to all the men on each division each month on the subject of safety. In these talks the accidents reported during the previous month are used as text. The accident records of the railway department show that this plan is effective. Thus all accidents for 1925 show a reduction as compared with the previous year from 6,778 to 5,599, or more than 17 per cent.



Neat Car Stop Sign on Ornamental Lamp Post, Used Generally in Atlanta

Credit Organization Encourages Thrift

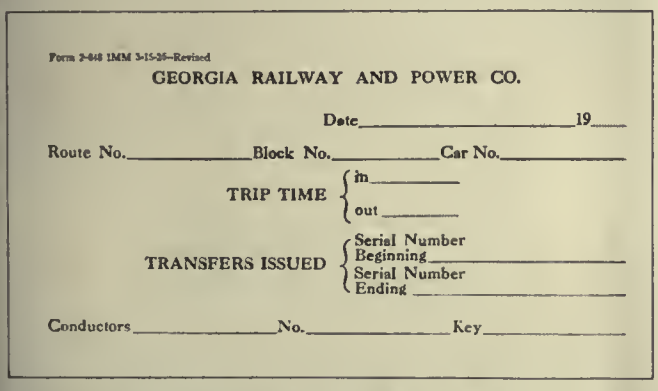
The latest addition inaugurated by the company is a credit union based on the Filene system, which has been adopted by a number of steam railroads and other corporations. Other unions along the same lines have been organized at Louisville by the Louisville & Nashville Railroad, at New Orleans by the Illinois Central Railroad, at Council Bluffs by the Union Pacific Railroad, at Boston by the New England Telephone & Telegraph Company, and in Mr. Filene's own store in Boston, where the membership is 1,636. A law author-



Box Near Terminal of Run, in Which Trainmen Deposit Transfer Slips at the End of Each Trip

izing the establishment of a credit union of this kind was enacted in Georgia last summer, that state being the twenty-fourth to have such a statute.

Briefly, the credit union is a co-operative savings and loan association, for whose stock any employee may subscribe and thereby become a member and from which any member can borrow limited sums at reasonable rates of interest. It therefore helps to stimulate thrift through a system of savings, solves the short-term credit problem of the employee and educates the members in the management of money. While subscriptions to the stock may be paid in cash, members are encouraged to pay for them by installments, so that if a member wishes to save a dollar a week, for example, he subscribes for four shares and deposits 25 cents a week for each share. The par value of each share is $5 and a limit of $500 has been placed on the amount of stock which may be held by any one person.



Form 2-648 1MM 3-15-26—Revised

GEORGIA RAILWAY AND POWER CO.

Date_____19____

Route No._____Block No._____Car No._____

TRIP TIME { in_____ out_____

TRANSFERS ISSUED { Serial Number Beginning_____ Serial Number Ending_____

Conductors_____No._____Key_____

Front of Envelope Used by Conductors and One-Man Car Operators for Depositing Transfers at the End of Each Trip

Members may also make deposits, but the maximum deposit permitted any member is $500.

Loans up to $50 are made to any member whose name is approved by the credit committee. No security is required for loans up to this amount except the borrower's note. Loans for more than that sum must be secured. The interest rate charged is 6 per cent and interest is deducted at the time the loan is made. A maximum of $150 is set for secured loans.

The organization is managed by the employees, but in Atlanta one of the fiduciary officers of the company acts as its treasurer. Officers are chosen from and by the members at elections, in which each member has but a single vote, whatever his shareholdings. Besides the officers and directors the organization has a supervisory committee and a credit committee. The latter body passes on all loans and the supervisory committee serves as a check on officers and directors. The overhead expenses are very low, as no salaries are paid to any one, and the company charges the organization no rent for a room in one of its carhouses used as an office. Hence, the greater part of the interest received on loans can be used as income to pay dividends. It is expected that a dividend rate of 4 per cent can be maintained.

Employees of the company who are not owners of stock are permitted to deposit their savings in the union and receive 4 per cent interest, but they are not eligible for loans. The maximum deposit for any non-member is the same as for a member, namely, $500.

At the time of the organization of the union, early this year, subscriptions for more than 380 shares of stock had been received.

Why Electric Cars Will Remain in Berlin

Transportation Expert Calculates that if Buses Were Substituted for Electric Cars in Local City Service Fares Would Have to Be Doubled

COSTS of handling the surface car traffic in Berlin by buses instead of by electric cars have recently been estimated by Dr. E. Giese, professor of transportation at the Berlin Technical High School. The results appear in the issues for April 30 and May 7 of *Verkehrstechnik*, and Doctor Giese finds that a fare twice that now charged on the surface lines would have to be charged if buses should replace the cars. The street railways in the city are operated by a stock company, but all of its shares are owned by the city, so that the system is essentially a municipal enterprise.

Doctor Giese assumes at the beginning of his study that if the buses were substituted for the surface cars they would have to assume the same street paving charges. The cost of this paving charge to the Berlin tramway system last year was $1,200,000 (5,000,000 marks) as the company was responsible for the paving of a strip 9.3 ft. (2.84 m.) wide for each track and also for the upkeep of all parked reservations through which the lines operate. Other special obligations of the street railway are a traffic tax, which is now 3.85 per cent of gross (1.1 cents per car-mile or 2.9 pf. per car-kilometer) but will be 5.66 per cent of gross (1.6 cents per car-mile or 4.2 pf. per car-kilometer), and also an 8 per cent gross earnings tax paid to the treasury of the city. In contrast to these charges, the vehicle tax on motor buses is only $48 (200 marks) a year, and road maintenance charges are exacted only by some of the communities outside Berlin.

Doctor Giese makes the following comparison of the principal items of expense after omitting gross earning and other taxes which have nothing to do with the economics of the case:

COST OF CONDUCTING TRANSPORTATION

	Cents per Car-Mile*		Pfennigs per Kilometer	
	Car	Bus	Car	Bus
Salaries and wages	6.1	8.1	15.8	21.0
Power or fuel	2.2	5.4	5.8	14.0
Tires (solid)	....	1.9	....	5.0
Maintenance of way	1.3	....	3.3	....
Street upkeep	....	3.1	....	8.0
Maintenance of overhead line	0.2	....	0.5	....
Maintenance of rolling stock	2.0	5.8	5.2	15.0
Depreciation	2.5	4.4	6.6	11.5
Miscellaneous and taxes	2.3	3.8	6.0	10.0
Interest and amortization	3.8	2.1	10.0	5.5
Total cost on vehicle-mile or kilometer basis	20.4	34.6	53.2	90.0
	Cents		Pfennig	
Total cost per mile, or kilometer, per passenger capacity, seated and standing	0.292	0.641	0.76	1.67

*In this table and elsewhere in this article a mark is taken as equivalent to 24 cents and a kilometer as 0.625 mile.

Greater Capacity Accentuates Car Superiority

It will be seen that on a vehicle-mile basis the bus costs about 1.75 times as much as the car. On a passenger-capacity mile basis the bus costs 2.2 times as much as the car. This capacity comparison is based on the assumption that the bus operator would use his largest double-deckers. One of these is rated as a 59-passenger bus, made up of 24 seats and room for three standing passengers on the lower deck, room for six standing passengers on the platform and 26 seats on the upper deck. The other bus is like that just mentioned except that it has only 21 seats on the upper

deck. As the upper deck is not much used in bad weather, Doctor Giese assumes the average capacity of all buses as 54.

On the other hand, the trolley service would be made up of 55 per cent motor car and 45 per cent trail car mileage, each unit having a capacity of 70 passengers, estimated as follows: Twenty-four seats and room for fifteen standing passengers inside the car plus room for fifteen and sixteen standing spaces on the platforms. The personnel requirements would be one man for each 47 car riders (three men for 140 passengers), as compared with one man for each 27 bus riders (two men for 54 passengers).

Buses Would Require Double Fare

In 1925 the average cash fare on the cars was 3.6 cents (15 pf.). From the comparison of costs given in the table it is apparent that the buses would have to charge a fare 2.2 times as much, or 7.92 cents (33 pf.). Even if the buses had a somewhat better load factor their fare could not be less than 7.2 cents (30 pf.).

As a matter of fact, the trolley fare was less than 3.6 cents (15 pf.), due to the sale of reduced-rate monthly cards. This brought the average rate per through ride down to 3.21 cents (13.39 pf.). The rerouting of the Berlin system in accordance with the American transfer plan has produced a transfer ratio of 42 per cent, yielding a rate of only 2.33 cents (9.7 pf.) per trip. The street railways, largely because they include considerable mileage in thinly settled suburbs, averaged only 8.5 passengers per car-mile (5.18 passengers per car-kilometer), whereas the buses, which operate largely on city routes, averaged 8.99 passengers per car-mile (5.62 per car-kilometer).

The fare on cars for an average ride of 2.94 miles (4.7 km.) was 3.21 cents (13.39 pf.), or 1.09 cents per mile (2.85 pf. per kilometer). The fare on the buses for an average ride of 2.2 miles (3.5 km.) was 4.1 cents (17.2 pf.), or 1.86 cents per mile (4.9 pf. per kilometer), or 72 per cent more than the fare on cars.*

On the basis of 800,000,000 passengers a year and an average ride of 2.94 miles (4.7 km.) per passenger, the street railways run 2,352,000,000 passenger-miles (3,760,000,000 passenger-kilometers). If this figure is multiplied by the present actual difference in fare (4.9 minus 2.85), the public of Berlin would have to pay 77,000,000 marks (or $18,480,000) a year more for surface transport if street railways were abolished. This estimate is on the assumption that a blanketing bus system would charge only 72 per cent more, but in reality the taking on of thin routes, street railway style taxes, etc., would call for a 100 per cent rise in fare.

The net result would be that buses would charge 214,000,000 marks ($51,360,000) a year instead of 107,000,000 marks ($25,680,000).

The Berlin public, says Doctor Giese, cannot afford any 107,000,000 mark luxuries. It is proving hard enough to raise only 10,000,000 marks for the breakthrough of dead-end streets in congested districts.

In further explanation of the figures in the table, Doctor Giese says that the power item for the trolley is figured at 2.15 cents (8.98 pf.) per kilowatt-hour, which is only a little more than 5 per cent above the pre-war rate. Superpower developments are likely to make for lower rather than higher power costs in the future. On the other hand, automotive fuel (gasoline and benzol) now costs 40 pf. per kilogram, as against pre-war costs of 22 to 28 pf., and it is of poorer quality. The tremendous expansion of the automotive field does not tend toward lower fuel prices.

One reason for the higher power costs of a trackless vehicle lies in the higher tractive resistance. This resistance is only 24 to 30 lb. per ton (12 to 15 kg. per metric ton) for motor cars and 10 lb. per ton (5 kg. per metric ton) for trailers, while buses on asphalt have a resistance of 40 lb. and on rougher paving of up to 70 lb. per ton (20 kg. to 35 kg. per metric ton).

There is a possibility that taxes might be lowered once the government has rebuilt the highways to meet the heavier traffic, but this lies in the future.

Tire cost is based on the use of solid tires, but pneumatics would cost four times the figure given. This increase is 1½ times the entire interest and amortization charge of the street railways. A possible later reduction in the cost of giant pneumatics is only a guess.

A comparison of the cost of new equipment shows that a motor car of 70 passengers capacity costs $8,400 (35,000 marks) and a trailer of like capacity $4,800 (20,000 marks). On the basis of the present proportion of motor cars and trailers in Berlin the average replacement cost per car for the present 3,153 cars in Berlin may be taken as $6,648 (27,700 marks) each, or $94.80 (395 marks) per passenger served.

A 54-passenger capacity bus would cost $7,200 (30,000 marks) or $133.44 (556 marks) per passenger—40 per cent more per passenger than the car. To do the same job as the cars 4,000 double-deck motor buses would be needed.

The present interest and amortization charge is on an investment of approximately $60,000,000 (250,000,000 marks), of which 80 per cent represents the principal property taken over, viz., the Grosse Berliner Strassenbahn. Interest and amortization are covered by a charge of 6 per cent. New capital for motor buses could not be obtained at this favorable rate.

Increasing Importance of Street Railway

Finally, Doctor Giese shows that the street railways have more than recovered their pre-war importance in the Berlin transport scheme. In 1913 street railways carried 50.5 per cent of all traffic. In the unsettled rerouting year 1924 the average was only 39 per cent, but 46.3 per cent was attained in December, 1924. In January, 1926, the ratio was 53 per cent.†

No responsible authorities, concludes the author, could put forward any such proposal as the replacement of the Berlin street railway system. Because of the higher cost of bus operation its field appears to be:

1. Operation in streets where track is not feasible or permitted.
2. To supply additional service where streets are wide enough.
3. For feeders and cross-country runs.
4. For non-stop special fare service and for night operation at owl fares.

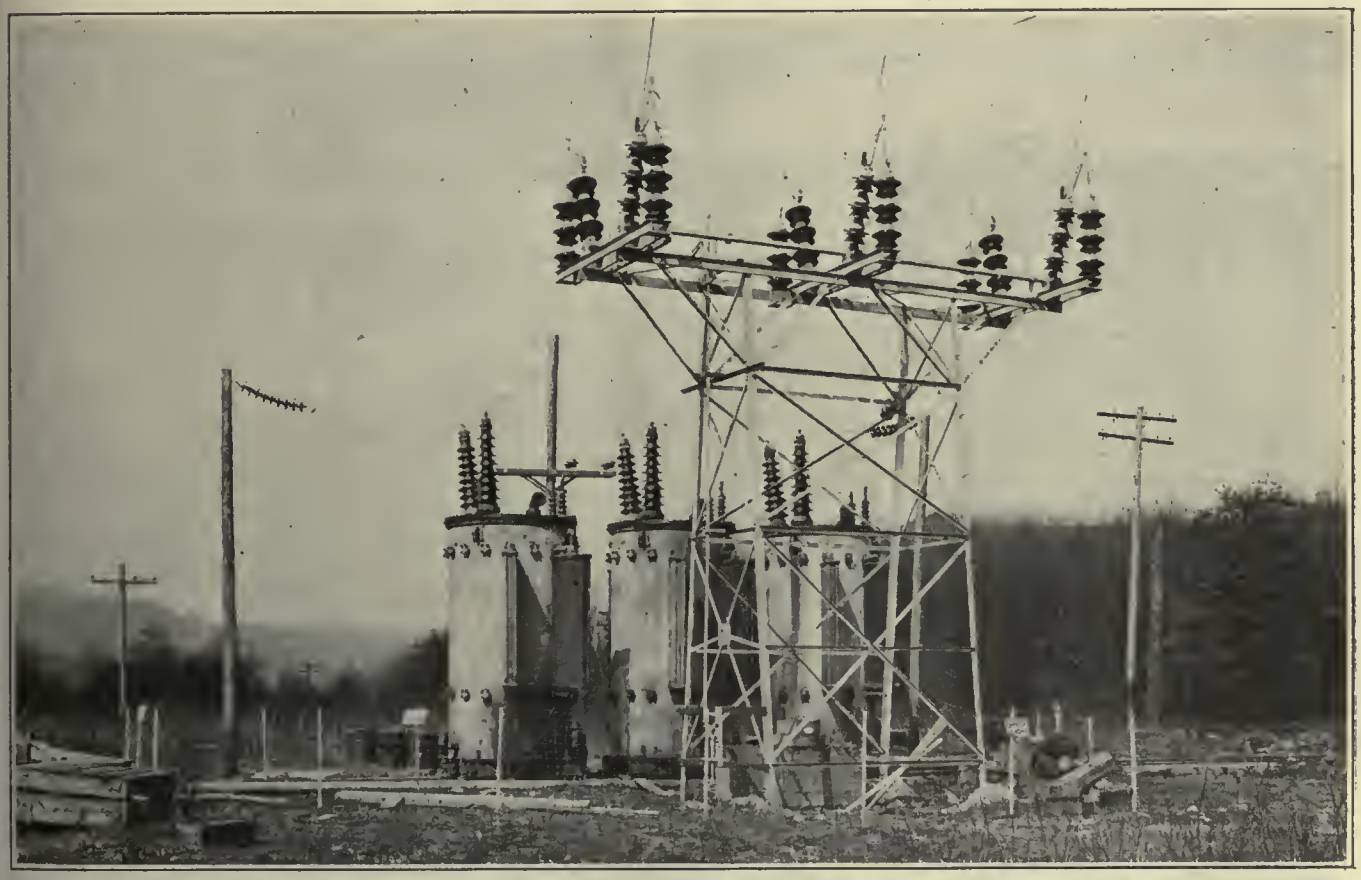
If economic reasons alone were to govern, there would be no further development of motor bus routes in Berlin. However, there is a place for them in a co-ordinated system which would charge correct rates and make each type of transport carry its fair share. In the opinion of the author, such co-ordination should be under municipal control.

*City bus fares are on the basis of 15 pf. for the first zone, 20 pf. for two zones and 25 pf. for three zones. The zones average 2.2 miles (3.5 km.) each.

†In March, 1926, the street railway percentage was 56. In the meantime, the bus percentage had grown from 6.2 per cent in January to 7.5 per cent in March.—EDITOR.

Transportation Service Continued During Flood

Citizens of Oil City, Pa., Carried by Company's Buses and Emergency Equipment During the Recent Devastating Ice Jam on the Allegheny—Trolley Service Quickly Restored



Temporary Set-up of Transformer Equipment Made at Petroleum Center to Serve the Floodstricken Area About Oil City

PICTURE an emergency substation constructed in perilous fashion on the top of a coal pile. Grinding, smashing blocks of ice were rising slowly but inevitably in the river alongside a power plant normally furnishing energy for three busy industrial centers. Its equipment was submerged and out of commission after a gallant but futile fight to withstand the icy invader; streets and basements were under water throughout the business districts and the grim prospect of still further rises of the ice-choked river before the frozen barrier would be swept away by sheer pressure of the water behind it. That, in brief, was Oil City, Pa., during the course of the devastating flood which visited the Allegheny River in February and March. Now the flood is history; but its consequences, as is the case with all cataclysms, are destined to make themselves felt for some time.

Even today transformers and various other equipment may be seen standing about in varying stages of disarray within the plant of the Citizens' Traction Company and the Citizens' Light & Power Company, while heating coils of many breeds are placed on, under and around them. The process of drying out is a slow one and the end is not yet. Scarcely a day passes in which a generator or motor failure does not occur, due to the ruinous soaking which practically all the company's equipment experienced. V. A. Redfield, vice-president and general manager of the two companies, believes that these unfortunate failures, which are a direct result of this devastating flood, will continue for at least a year.

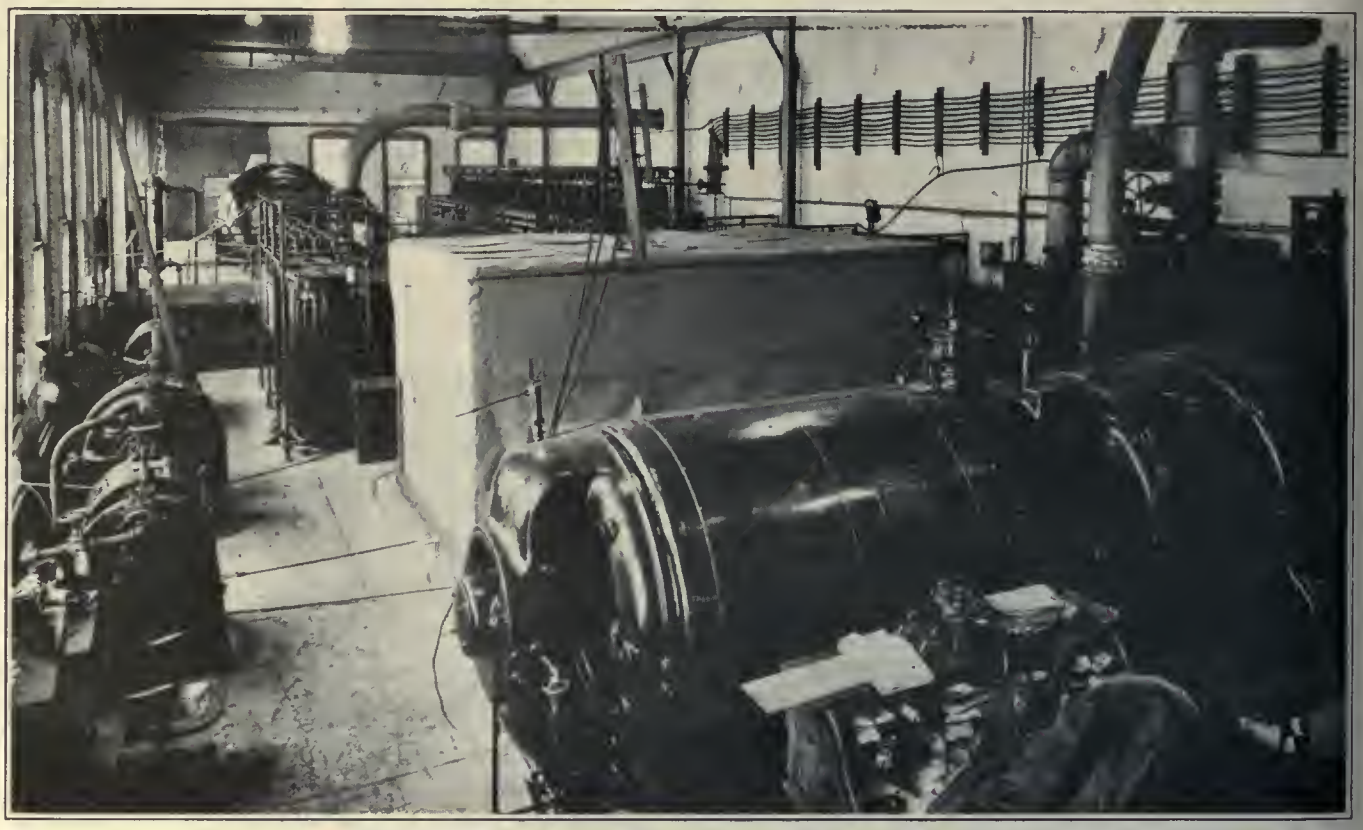
While nature was on the rampage, transportation facilities were naturally much crippled. Were it not that the same conditions which forced the discontinuance of trolley service caused also a marked temporary cessation of industrial activity throughout the stricken area, thus removing the usual peak-load conditions on the transportation facilities, the Citizens' Traction Company would have been forced to acknowledge defeat. Actually, the bus equipment possessed by the company was able to cope quite successfully with the situation during the period from March 22 to March 29, when the trolleys were out of commission. Every available bus was placed in service and kept there, by dint of

24-hour-per-day labor on the part of the mechanical department of the transportation company.

The story of the fight to prevent a total paralysis of power and transportation service to the cities served by the Citizens' company, of the herculean efforts of employees of the company and of hosts of volunteers to save the high-tension power lines from destruction, of the growing fear that the plans to break the ice jam would go for naught and that the gorge would only be freed as the force of the vast body of water, rising several additional feet, finally broke out the ice barrier, perhaps taking large portions of the cities of Oil City and Franklin along with it—all of this is an epic to be written in words of fire. But to attempt to chronicle it here is out of the question. Let the fact of accomplishment stand for the telling!

power, light and electric transportation in the event that the Oil City power house should be inundated. However, the unprecedented rise in the Allegheny nearly set these carefully laid plans at naught by flooding the switches and the transformers located in the yard adjacent to the power house. Hence, it was necessary to move this essential equipment to the highest point on the coal pile of the plant. Picture the workmen laboring mightily over the rising waters on the uncertain footing provided by this coal pile, with swirling torrents, laden with gnashing ice blocks at their feet and the deadly high-tension wires a few feet overhead, the general effect being enhanced by a liberal contribution from above by J. Pluvius!

Transportation facilities in the flood-visited area are now practically back to normal, and the power equip-



A Scene in the Oil City Power Plant Showing the Method Employed to Dry Out Part of the Rotary Equipment

The first high water in the Allegheny occurred on Feb. 21, and at that time it was made evident that emergency steps would doubtless be required to combat the encroaching flood waters. Accordingly, the Citizens' company made arrangements with the Penn Public Service Company to interconnect systems and thus supply the Oil City district from the latter's Piney Dam hydro-electric plant. To do this it was necessary to build 3½ miles of 25,000-volt line and secure three transformers to step down the voltage from the Penn company's 110,000-volt system to the Citizens' Light & Power Company's 25,000-volt line. The three transformers were borrowed from the West Penn Power Company at Kittanning and given a temporary set-up adjacent to the Pennsylvania Railroad right-of-way and the Penn Public Service Company's high-tension lines at Petroleum Center. To plan and carry out this project was no small undertaking, but it was carried through successfully, so that by March 12 the people of Oil City, Franklin and Titusville were assured of

ment is being brought to that stage as rapidly as is possible. It is estimated that the direct consequences of the flood will cost the Citizens' companies approximately $40,000 or $50,000, exclusive of losses of revenue during the period of the flood. The loss of the Big Rock bridge will necessitate the abandonment of 11 miles of track which formed the connecting link between Ausley and Franklin. This line may be permanently served hereafter with bus equipment. Abandonment proceedings are now before the Public Service Commission of the commonwealth of Pennsylvania.

Electric power and trolley service was not disturbed in Franklin, due to the emergency arrangements made by the company. Power service in Oil City was out only eighteen hours, a rotary converter being installed in the city on March 28 and service being resumed on March 29. After that date the attention of the company was chiefly taken up with ascertaining the extent of the damage and overhauling equipment for normal service once more.

Police Officers Can Do Much to Improve Transportation

Control of Traffic Should Be on the Basis of Service to the People and in Proportion to the Number Served and Not to Help the Company as Such

BY STANLEY GOOD
Traffic Captain, Police Department, El Paso, Tex.

EDITOR'S NOTE.—Stanley Good was the principal speaker at the session of the recent Galveston convention of the Southwestern Public Utilities Association, devoted to traffic. As reported in the April 17 issue of the ELECTRIC RAILWAY JOURNAL, this meeting was one of the first of its kind given over to the discussion of traffic by the police officers of cities. Mr. Good expressed so many sound principles that he was asked to write the present article on this general subject. The broadminded views expressed show the author's intelligent appreciation not only of traffic regulation but of public service *per se*.

PERSONALITY in public service is of outstanding importance and today is being recognized as a greater factor in securing increased business and more satisfied customers than any other form of advertising. In addition to being the most effective, this is also by far the most economical form of publicity.

Officials of all public service companies are giving much serious thought to the training of employees in the art of salesmanship, realizing that in the personality of their employees lies the secret of effecting more sales and creating greater customer satisfaction. Even an imperfection in service is apt to be overlooked where the employee is courteous and solicitous and succeeds in selling himself to the public.

Now the policeman is just as much a public servant as the street railway operator. The public pays for the services of both. If the street railway operator, through his personality, is able to make friends of the public, he gets their support, resulting in increased efficiency and better service. The policeman can do the same thing to an even greater extent. In the case of the police officer, he is able to overcome the feeling of antipathy that the public has borne toward him which it has never felt toward the street car operator.

The purpose of all public utility companies is to render a needed public service at nominal cost. Since, after all, only a small proportion of our population can afford the luxury of individual transportation, a vast majority must depend upon a public service which is able to transport them cheaply and in a mass during rush hours or unusual periods.

The duty of the policeman in charge of the streets is to superintend all traffic and co-ordinate its movements. Being a public servant, he is employed by all of the people, not just a small portion of them. His services must not be to a select few only but to the masses.

It would not be consistent with justice to permit a pedestrian, or an automobile occupied by only one or two passengers, to monopolize that portion of the street allotted to the street car to such an extent that the 40 or 50 passengers in the street car might arrive late at their destination. The rights of the public carrier, as such, does not enter into consideration. It is solely a question of the rights of those being transported, who represent the majority. They have paid for a service which the operator does his best to give and it is the duty of the policeman to see that they get it. If the traffic officer has been properly trained and capitalizes his personality this should be possible without the necessity for antagonizing any one. If a policeman lacks personality, change policemen.

Men of intelligence, fairness, tact and courtesy in dealing with the public are as necessary at busy street intersections as on the platforms of the street cars. Street car operators have demonstrated to their own satisfaction that a car may be crammed with passengers, but by using politeness, no one complains. By using the same tactics a policeman can unravel any traffic jam. In an emergency, a hard-boiled traffic cop is as useless as a careless street car operator. Neither of them is efficient, nor can they get the necessary co-operation of the public.

Any city where results in handling the traffic problem are measured by the number of arrests made for violations of the law has little efficiency. The most successful police officers are those who recognize that their chief mission is to preserve the peace rather than to prosecute its violations.

In El Paso, Tex., the policemen are taught that it is their duty to prevent violations of the law in a way that will meet with the satisfaction of all concerned. These policemen remain in the open in conspicuous uniforms and make it a point to get acquainted with the people living on their beats, calling them by name whenever they meet. The policemen vie with one another in their efforts to make friends, and when it becomes necessary to make an arrest, they refuse to argue with the person arrested and never assume the right to reprimand a citizen, since that is the power of a judge alone. Needless to say, the policemen in that city are popular, and crime and accidents are steadily decreasing, which goes to prove that personality in police work is no longer merely an untried theory.

Milwaukee Cars Carry Heaviest Traffic

RECENT checks of traffic on Grand Avenue, Milwaukee's busiest street, by the transportation department of the Milwaukee Electric Railway & Light Company, show that while eighteen automobiles passed given spots for every one street car, the street cars carried four times as many persons and occupied only one-third as much street space.

Street cars on the average carried 42 passengers per car between the hours of 6 a.m. and 6 p.m., buses carried 10.4 and private automobiles 1.34.

The study shows that the street car passenger occupied only 9.5 sq.ft. of street space, the bus rider 17.3 sq.ft. and the private auto rider 45.7 sq.ft.

Parked vehicles, between the hours of 6 a.m. and midnight, occupied 38 per cent of the street space between the Northwestern depot and Eighth Street; moving autos and trucks, 44 per cent; street cars and buses, 18 per cent.

7.9 per Cent Were Walkers

IN THE article "Better Car Routing and Traffic Control Proposed for Baltimore" in the May 22 issue of ELECTRIC RAILWAY JOURNAL, the figure is given in the table at the bottom of page 888 that 79.9 per cent of the persons working in the central business districts were walkers. This figure should have been 7.9 per cent instead.

Maintenance Notes

Press Can Supplies Thick Paint

THE silk-screen process for sign painting as used by the Department of Street Railways, Detroit, Mich., was described in issues of the ELECTRIC RAILWAY JOURNAL for Feb. 14, 1925, page 261, and March 13, 1926. A press can, which is used to supply the thick paint to the screen as required and which adds materially to the efficiency of the process, is illustrated herewith. The thick paint as needed for the sign is supplied from a can of 8-in. diameter and 18 in. high, which is mounted above the center of the bench used for the sign-painting process. This can is placed on a support made of steel bars. It is provided with a plunger and operating mechanism at the top. The plunger inside the can is made to move up or down by means of a rack and pinion attachment, the plunger itself being directly connected to the rack. The pinion is mounted on a short cross-shaft, the end of which is provided with a four-spoked wheel. The operator can thus move the plunger up or down by turning the spoked wheel by hand.

The bottom of the can is conical and a ½-in. pipe attachment is provided. Over this a 1-in. hose serves as the flexible connection for delivering the paint to the screen. The illustration shows the operator in the act of placing some of the thick paint at the top of the screen for squeegeeing it onto the sign. By turning the hand screw the paint is forced out of the end of the hose and can then be spread over the surface as may be desired.



Thick Paint for the Silk-Screen Process Is Supplied to the Screen by a Press Can and Flexible Hose Attachment in the Department of Street Railways, Detroit, Mich.

Gas Furnaces for Soft Metal Melting

GAS-FIRED soft metal melting furnaces in which the temperature of the pots is automatically maintained at all times are part of the equipment of the Atlanta shops of the Georgia Railway & Power Company. These furnaces are designed to melt lead, tin, zinc, babbitt and other metals of about the same melting point. The burners are arranged to heat the pot and its contents up to a temperature of 1,200 deg. F., and higher, if desired, and the design and construction are such as to permit of quick heating which assures maximum production.

In the shops are three furnaces, two of 600 lb. capacity each, to melt babbitt, and the third of 175 lb. for solder. The outer shell of each of the babbitt furnaces is of heavy sheet steel, held in place by the top and bottom castings, which are connected by long, heavy bolts. The refractories used are of special forms, of selected grade backed up by proper insulation, while the pots are of cast iron.

These furnaces were designed and manufactured by the Surface Combustion Company of New York and are fired with gas, using burners which are so applied as to discharge tangentially into the combustion chamber. The hot gases pass around the entire surface of the furnace with a swirling, circular motion so that all parts of the pots are evenly heated. The vent is located close to the top of the casing, forcing the burned gases up around the pot, thus utilizing their heat to the fullest degree. The drain hole, also used for lighting, is conveniently located to permit the easy and safe flow of the contents in case of the breakage of the pot. Soft metals demand quick but even heats. Operators get to know the exact amount of heat required for certain metals and with this furnace this degree of heat can be obtained day after day simply by setting the rate of combustion on the gage. Furthermore, this temperature is automatically main-



Thermostatic Control Provides Even Heating Temperatures for Atlanta Company's Gas Furnaces

tained and recorded regardless of the operation of dipping out hot metal and throwing in cold, by a recording and regulating thermostat manufactured by the Brown Instrument Company.

The smaller size solder-melting furnace has a cast-iron body closely conforming in shape to the cast-iron pot, which assures a rapid transfer of heat through the pots. The bottom outlet valves of the improved type make it easy to cast molds. A bottom drain valve is opened by a wheel or lever and the metal drains from it into the mold.

The method of firing utilizes city gas, and was develpoed by the Surface Combustion Company. Combustion is maintained in a back pressure atmosphere so as to exclude all secondary air, and the flames are directed upon a refractory bed so as to develop the maximum possible amount of radiant heat. The flues are restricted and arranged so as to distribute the hot gases uniformly and to release them at the lowest possible temperature. The prevention of cold air leakage into the combustion chamber is a desirable feature because it prevents oxidizing effects; also by its cooling action the cold air would lower the furnace efficiency.

The installations are so designed that the furnace atmosphere can be varied at will, either by changing the gas orifice sizes in the inspirators in the high-pressure gas system, or by changing the insert in inspirators in the low-pressure air-gas system. This is an advantage because in certain classes of manufacture, such as vitreous enamel baking, an oxidizing atmosphere must be maintained in the furnace to insure against the reduction of the metallic oxide bases in the enamel. In certain other uses, such as metal treating, an oxidizing atmosphere would be injurious to the metal, causing it to oxidize with the formation of scale. To minimize this production of oxide or scale, a reducing furnace atmosphere is maintained.

The burners are made or molded of alundum or fire clay material to form burner tunnels, which are inclined in such a way as to direct the flames in the most effective manner upon the highly refractory carborundum-faced bed.

In the high-pressure gas system small compressors are utilized to boost the city gas from line pressure to about 10 lb. per square inch before it enters the patented mixing tubes. These venturi mixers maintain fixed air-gas ratios over a wide range of consumptions, irrespective of the quantity of gas used.

Temperatures are controlled by the regulation of needle gas valves, which govern the gas flow. By raising or lowering the pressure indicated on small pressure gages before each inspirator, the amount of gas supplied is increased or decreased, thereby raising or lowering the temperature. That is, the pressure is an indication of the quantity of gas being consumed. These gages have a range of 0 to 15 lb. per square inch.

In the low-pressure air-gas system the air instead of the gas is controlled by needle valves. In this system pressure or turbo blowers are utilized to supply air to the inspirators at pressures varying from 1 to 2 lb. per square inch. A diaphragm gas-pressure regulator reduces the gas pressure to atmospheric before it enters the inspirator, where it is proportioned with air in the correct amount for complete combustion. Otherwise these two systems are identical as far as method of firing is concerned.

Battery Charger Used for Economy

SO THAT the inconvenience and expense of sending storage batteries to an outside firm for charging might be eliminated the Beaver Valley Motor Coach Company, a subsidiary of the Beaver Valley Traction Company, New Brighton, Pa., has just installed a battery charger. It is of the 115-volt, 60-cycle, alternating-current type and is capable of charging ten



Wall Location of Battery Charger Economizes Shop Space

batteries simultaneously at the maximum charging rate of 10 amp., or twenty batteries simultaneously where the 6-amp. rate is used.

Batteries are first charged at the maximum rate for several hours and are then reduced to a 6-amp. charge, the entire process requiring from ten to twelve hours. It is estimated that the charger will save its own cost in less than a year, entirely aside from the greater convenience of charging batteries right in the company's garage. A Westinghouse Rectigon charger is used.



Each Shop of the Grand Rapids Railway Has Its Own Individual Waste Cans

Waste Cans Insure Uniform Saturation

GALVANIZED sheet-steel, journal packing waste cans, 22 in. in diameter by 30 in. high, are supplied to each of the maintenance shops of the Grand Rapids Railway, Grand Rapids, Mich. All waste is saturated at the principal repair shop of the company and is delivered by shop trucks in these cans to the particular shops where the packing is to be done. This insures uniform saturation of the waste, since it is all done by one man. The cans are provided with covers which fit tightly and thus prevent dust and dirt from entering the waste after it is saturated.

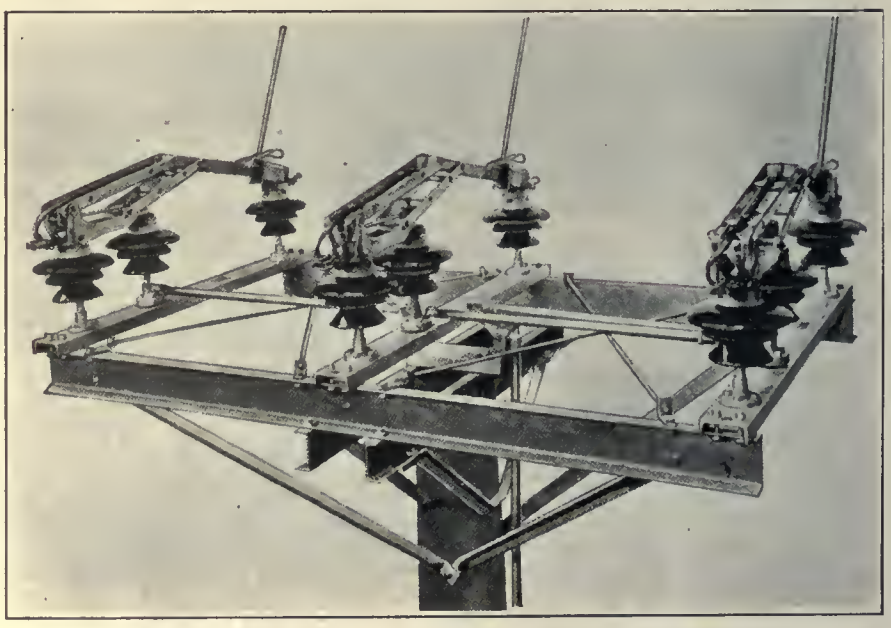
New Equipment Available

Pantograph Air-Break Switch

QUICK, positive and powerful movement of the switch blade is provided in a new pantograph air-break switch being marketed by Schweitzer & Conrad, Inc., Chicago, Ill. The straight-line action of the pantograph permits the blade to enter a fully-housed and protected contact clip. As the blade withdraws from the clip it rises into the arcing position. This, with the fixed horn, forms a pair of arcing horns on which the arc rises and breaks. The contact end of the blade is effectively protected from burning by the arcing fingers which it carries.

Current is carried by flat, flexible copper braids fastened securely to the switch blade and to the hinged terminal of the switch. The pantograph motion links are thus not required to carry current. Motion is communicated to the pantograph by a crank on top of the middle insulator which rotates through an angle of 90 deg. A feature of the design is that this crank passes dead center in closing the switch, thus locking each phase in the closed position independently of the operating handle or connecting rods between phases. Each phase is adjusted independently. The operating handle moves through a vertical arc of 180 deg. and communicates a reciprocating motion to the vertical operating rod.

Particular attention has been devoted to the contact clips. Independent floating contact fingers are pressed against the flat copper switch blade by phosphor-bronze leaf springs. The clip is thus perfectly self-aligning. Very liberal contact area is provided. A full housing open only at one end protects the clip from the weather. Provision is made for drainage of any water which may work into the housing. All bearings are brass or bronze on one side. Grease cups are provided at important points. In the larger switches, ball bearings are used at top and bottom of the rotating insulator.



Pantograph Switch on Single Wood Pole Galvanized Steel Mountings

Back Gearing for Shop Motors

A BACK-GEARED attachment designed to operate under the most unfavorable conditions is announced by the General Electric Company, Schenectady, N. Y., for use with its "500 series" induction motors. This attachment is of unusually strong construction and is easily installed and adjusted.

The base, to which the motor and back shaft pedestals are bolted and doweled, is a single large casting. A special unit-type pedestal is used, one casting forming the housings for the large back shaft bearings. Thus maximum rigidity and permanent correct alignment of shafts and meshing of gear and pinion are assured. The back shaft is provided with shoulders to limit end play and is made of special steel. It is supported by two extra large, double-seated, split bearings in dustproof housings, holding oil sufficient for a number of months operation.

A split gear case, fabricated from steel plates, protects the gear and pinion from dust and retains the grease or oil in which the gear runs. Two standard gear ratios are available. Steel or fabroil pinions with cast-iron gears may be used

Association News & Discussions

Operating Problems Hold Attention at Canadian Convention

Bus Operation, Budgetary Control and Maintenance Practice Are Principal Topics at Quebec Meeting—Attractive Exhibits Are Shown

BEAUTIFUL Quebec gave a cold reception to 275 members and guests at the 22d annual convention of the Canadian Electric Railway Association, held there June 2-4. The low temperature, however, merely served to increase the attendance and the enthusiasm manifested at the meetings.

The theme of the convention was given in the annual address of the president, W. S. Hart, treasurer Shawinigan Water & Power Company and Quebec Light, Heat & Power Company, Ltd. He emphasized the point that operators must improve their service with cars and must realize the value of the bus. Better publicity is needed. In this, he said, there always is room for improvement.

Following the presentation of reports of the treasurer and the secretary, committee reports were reviewed. That on accident prevention was read in brief by Chairman W. R. Robertson, general superintendent Hydro-Electric Railways, Toronto. Of all electric railway accidents in Canada, 65 per cent are collisions with automobiles, the largest portion of which are caused by autos turning out from the curb. Investigation shows that the one-man car is not a source of accidents. So far no case of accident on the Hydro-Electric Railways has been caused by the treadle door.

In the report of the motor bus and truck committee, read by Chairman F. D. Burpee, vice-president and manager Ottawa Electric Railway, results of a questionnaire were analyzed. Out of 25 member companies, 23 believe in having bus transportation furnished by the electric railways. In the opinion of the committee the best method which the railway members can adopt to eliminate motor bus competition is to go into the bus business themselves. This procedure may open up new and profitable channels of business.

In the discussion which followed, Gordon Lee, American Car & Foundry Motors Company, urged that officials of the various properties refrain from incorporating original ideas into the design.

G. H. Scragg, International Motor Company, said that some of the laws that have been passed in the United States are such that buses cannot run in adjacent states. Most of the restrictions are on bodies, so that the customer gets lower value in bodies than in chassis.

L. Tait, manager London Street Railway, London, Ont., outlined some of the methods of bus competition practiced in his city. One line started by the railway itself parallels a car route. It has built up a new business without hurting the car line.

Bus Operation Considered

The principal paper presented at the second day's session was that on bus operation, by D. J. Locke, staff engineer Public Service Railway, Newark, N. J., on "The Motor Bus in Urban Transportation." Mr. Locke's paper is abstracted elsewhere in this issue. A lively discussion followed, and Mr. Locke answered many questions regarding the practices of his company. C. M. Shaw, Montreal, felt that by adding bus service it would be possible to make more money on the investment and give the public more service.

A. T. Spencer, Toronto, stated that in Toronto a differentiation is made between motor buses and coaches. The bus is used as an adjunct to the street railway, while the coach is used independently for sightseeing, chartered service and at present on one regular route.

Mr. Locke outlined the history of bus operation in New Jersey. By 1923 the railway was so seriously affected by bus competition that it had to get control of the buses or abandon its rail operations. It was decided to get the buses. The company believes that the duplicate service which now exists in many sections is wasteful and that much better service will be given when co-ordination of the two vehicles is completed. He pointed out that at present the company is largely rendering a mass transportation service with its buses, a large part of which is uneconomic because it offers duplicate service.

Major Burpee pointed out that in Ontario one-man permits are allowed. An operator of a single bus can frequently make a profit for himself. The company may have to take a loss to operate the one vehicle, although the operation of the single bus in competition may mean an equal loss. Mr. Locke stated that most of the buses bought out by the Public Service Railway were operated by individuals. Whether or not a particular bus should be purchased is a local and individual problem involving many factors.

D. E. Blair, Montreal, agreed with Mr. Locke that the advantages of the combined rail and bus organization are that it saves duplication in supervision and maintenance. Replying to his question, Mr. Locke said that the geography of a system enters largely into the problem of housing and maintenance of buses. It has not been found desirable to group buses in numbers of more than 100 to 125 at any one point. On the Public Service system the units average less than this, in the smaller centers being not more than 20 or 30 buses. The availability of railway owned property is an element in this, and another is the dead mileage. In general a company must plan for expansion of its bus business. Another factor is the availability of the existing railway organization and its facilities. In most places on the Public Service system it has been unnecessary to set up a new operating organization.

The Irvington shops are used both for rehabilitating purchased buses and for regular operating overhaul. Mr. Locke believes that eventually many of the repairs will be made in the garages with overhauled units and the overhaul shop will be reserved for complete overhauling of large units of the equipment and for new construction. Body work can be handled to advantage by the railway organization on account of the similarity of the operations, while engine and chassis repairs may better be handled separately.

A. H. Foster, Brantford, is of the opinion that buses are here to stay. The railways are going to their use rather unwillingly, partly since they lack data on operating costs and fares that should be charged. He questions whether the rates charged in many cases will be found adequate.

Replying to a question by Mr. Shaw, Mr. Locke said that members of the Public Service street car and bus operating organizations are largely interchangeable. The operators of trolleys and buses are in one organization with one seniority list. On the semi-annual pick an operator may elect to change from trolley to bus or vice versa. Certain parts of the training are common, but special training is given for the two kinds of work. Road supervisors are the same to a certain extent, but some of these men are separate. The carhouse men are largely the same. Above these ranks the duties are mainly handled in common. The chassis maintenance is, however, separate.

The life of the earlier types of buses with truck chassis is comparatively short, being about four or five years. It is hoped that the gas-electrics will last at least ten years. The company is setting up 3 cents per mile for depreciation for a fleet of more than 800 buses of many types.

E. J. Murphy, statistician American Electric Railway Association, referred briefly to the work of that organization, particularly with regard to motor

buses. He pointed out that the Accountants' Association has drafted a uniform system of bus accounting.

BUDGETARY CONTROL DISCUSSED

Presentation and discussion of the paper on "Budgetary Control," by H. C. Patten, was the principal business at the Friday session. An abstract of this paper will appear in a future issue. Mr. Hart pointed out the value of the budget in guiding the activities of a company. W. R. Robertson believes that it is of inestimable value, as it makes a comparison between divisions and departments.

H. E. Weyman, Levis, stated that even a small company can utilize a budget system. He finds it best to figure on the minimum revenues and maximum expenses. Then if the cost estimates are to be exceeded careful consideration should be given. The monthly figures are not of much value on the small property. If too much attention is paid to them the budget becomes unstabilized. Special expenditures are shown as extraordinary items. On the Levis property some 70 per cent of the costs are fixed, so that it is not always wise to hold to a car-mile basis.

Mr. Foster stated that he puts large expenditures into a special account and allocates them over a certain length of time.

Mr. Spencer in his estimates divides trackwork into ordinary and extraordinary expenses. The first covers the current work, while the second consists of work of large character, but which does not go into the renewal account. Postponing or advancing the work in any department will distort the budget but can be explained readily by the department concerned.

Mr. Tait is of the opinion that all companies practice some degree of budgetary control, although perhaps unconsciously. There always is an endeavor made to forecast what will take place.

OPERATING PRACTICES CONSIDERED

In past years a list of "Timely Topics" has been prepared for discussion, but the program has been so full that this year they have not been considered. In this convention the innovation was made of placing two such topics on the program each day, with two leaders assigned to head up each discussion. On the first day transfers and sweepers were considered. The discussion on transfers was led by J. McCulloch, traffic superintendent Toronto Transportation Commission, and C. M. Shaw, superintendent of transportation Montreal Tramways.

There was some controversy as to the relative value of single-truck and double-truck sweepers. Major Burpee stated that for conditions such as those obtaining in Ottawa with heavy snow the double-truck type are much better. The single-truck sweepers are satisfactory with light snow. In Ottawa sweepers have cleared as much as 3 ft. of snow. There the snow-fighting organization is lined up before winter begins. Volunteers are called for to take sweeper runs for the season. These men are relieved from their regular duties and report for snow work as soon as the snowfall begins. The pay for this is 5 cents per hour more than the regular rate. A. M. Lindsay, superintendent of rolling stock Montreal Tramways, believes the single-truck sweeper is better for all-around work. Given sufficient weight and power there are relatively few situations it will not handle.

Schedule speeds were also considered. G. E. Waller, Hamilton, believes that causes of low speed and delay should be avoided as much as possible and existing causes should be removed wherever they can. In addition to delays which can be charged against railway operation some are entirely beyond its control, while there are others over which the railway has only partial control. A. J. Tobin, superintendent Ottawa Electric Railway, told of methods used for maintaining headways on his property. His talk was illustrated with charts and time-tables from actual records.

Dipping and baking armatures was the second topic for the day. A. M. Lindsay, Montreal, holds that a good baking varnish tends to increase the life of armatures. On old armatures the penetration is small, seldom more than half the depth of the slots. Armature breakdowns are due to (1) insulation failure, caused by drying out of the insulation, (2) injury caused by vibration, (3) accumulation of moisture. Dipping and baking tightens up the coils in the slots, seals up the cracks in the insulation and dries out the moisture. All baked armatures have shown an increase in the number of miles operated per failure. Similar results are shown on other properties.

D. Chenard, master mechanic Levis Tramways, began dipping armatures in 1923, but it took a year to show the value of the practice. In 1924 there was a 5 per cent decrease in pull-ins.

A. T. Spencer, Toronto, opened the discussion on patching of concrete paving. Unless a quick-setting cement can be used the various asphalt or coal-tar products must be used for patching. Repairs to all classes of paving can be avoided by care in maintenance. T. U. Fairlie, Hydro-Electric Railways, Toronto, does not believe in making repairs with concrete under traffic, hence some form of mastic filler is essential. Numerous steam railroads have used this method.

Car painting was discussed under the leadership of F. S. Beattie, superintendent car department Ottawa Car Manufacturing Company, and F. E. Holland, manager railway sales the Sherwin-Williams Company of Canada. Mr. Beattie stated that spray painting can be done at lower cost and gives a better appearance, both interior and exterior, than the brush method. When colors are changed, there is no practical difference in method from that needed with the brush.

Mr. Holland feels that the pleasing effect on the passengers of paint is worth more than the protection afforded the material of which the car is constructed. Many companies have adopted the spray method to advantage. With the brush three-fourths the cost is for labor, and with the spray there is a saving of 35 to 45 per cent in the total cost of painting. The correct material must be used and the method must be followed rightly. If done properly better results will be obtained with the spray than with the hand brush.

As in past years the convention was held in conjunction with that of the Canadian Electrical Association. The sessions were entirely independent, however, except for the luncheons the first two days and the banquet Thursday evening.

At the Wednesday luncheon, Dr. C. A. Eaton of the Nela Lamp Works of the General Electric Company, gave an inspiring address on the possibilities of Canada.

The luncheons on Friday were held independently for the two associations. The electric railway men were addressed by Morris Buck, managing editor ELECTRIC RAILWAY JOURNAL, who reviewed the progress that has been made during the past few years along the lines of co-ordination, and the new viewpoint of railway operators toward better merchandising and a better conception of their place in the community as purveyors of transportation.

Many excellent exhibits of railway material and buses were shown.

At the close of the convention the following officers were elected for the ensuing year:

Honorary president, P. W. Ellis, chairman Toronto Transportation Commission and Toronto Hydro-Electric Systems.

Honorary vice-president, Acton Burrows, president Acton Burrows, Ltd., and proprietor *Canadian Railway and Marine World.*

Honorary advisory council: T. Ahearn, Ottawa; E. A. Evans, Quebec; D. E. Galloway, Montreal; George Kidd, Vancouver; A. W. McLimont, Winnipeg.

President, W. R. Robertson, general superintendent of railway, Hydro-Electric Power Commission of Ontario.

COMING MEETINGS OF *Electric Railway and Allied Associations*

June 21-25—American Society for Testing Materials, annual meeting, Haddon Hall, Atlantic City, N. J.

June 21-25 — American Institute Electrical Engineers, annual convention, The Greenbrier, White Sulphur Springs, W. Va.

June 25-26 — New York Electric Railway Association, annual meeting, Hotel Champlain, Bluff Point, N. Y.

June 28-July 2 — Central Electric Railway Association, summer meeting, S. S. South American, Buffalo, N. Y., to Chicago, Ill.

July 8-10—Midwest Electric Railway Association, annual convention, Brown Palace Hotel, Denver, Colo.

August 12-13 — Wisconsin Public Utility Association, Railway Section, La Crosse, Wis.

Oct. 4-8—American Electric Railway Association, annual convention and exhibits, Public Auditorium, Cleveland, Ohio.

Vice-president, H. E. Weyman, manager Levis Tramways.

Treasurer, H. E. Patten, comptroller Toronto Transportation Commission.

Executive committee: The president, vice-president, treasurer, immediate past-president (W. S. Hart) and T. W. Brackenreid, Port Arthur; D. E. Blair, Montreal; F. D. Burpee, Ottawa; A. H. Foster, Brantford; G. Gordon Gale, Hull; D. W. Houston, Regina; H. K. McLean, St. John, N. B.; D. W. Harvey, Toronto; J. E. Watkins, Winnipeg; C. L. Wilson, Toronto.

C.E.R.A. Program Announced

NOT a moment will be idle on the boat trip of the Central Electric Railway Association, which constitutes the summer meeting of that body. The formal program of the sessions, which has just been announced, covers Tuesday and Wednesday mornings and Thursday afternoon. It is given below:

PROGRAM

Tuesday, June 29, 9:30 a.m.

"Developing Off-Peak Regular-Schedule Business," by Walter Draper, president Cincinnati Street Railway, Cincinnati, and Ralph Emerson, general manager Cleveland Railway, Cleveland. *Discussion.*

"The Unequal Utility Tax Burden," by Lesley Vickers, economist for managing director, American Electric Railway Association, New York. *Discussion*, by A. C. Blinn, vice-president and general manager Northern Ohio Power & Light Company, Akron.

"Why Associations?" by D. L. Gaskill, secretary-treasurer East Central Division National Electric Light Association, Greenville, Ohio.

Wednesday, June 30, 9:30 a.m.

"Electric Railway Fires; Their Cause and Prevention," by J. S. Mahan, Western Actuarial Bureau, Chicago, Ill., president Western Section International Association of Electrical Inspectors.

"The Electric Car of Tomorrow," by John A. Dewhurst, associate editor ELECTRIC RAILWAY JOURNAL.

"Maintenance as Related to Selling the Service":

From car equipment standpoint, by J. F. Uffert, superintendent of equipment New York State Railways, Rochester.

From maintenance-of-way standpoint, by Jonathan Wolfe, Chicago Surface Lines, Chicago.

From overhead standpoint, by M. W. Cooke, superintendent of current control Pittsburgh Railways, Pittsburgh.

Thursday, July 1, 3 p.m.

"Advertising for Traffic," by Labert St. Clair, director of publicity American Electric Railway Association, New York.

"How Employees Can Sell Transportation," by H. M. Lytle, vice-president Chicago, North Shore & Milwaukee Railroad, Chicago.

"Developing Excursion Bus Business," by L. H. Palmer, vice-president and general manager Fifth Avenue Coach Company, New York, and G. B. Powell, general manager Kentucky Carriers, Inc., Louisville.

While the entertainment schedule is not yet rounded out a tentative outline follows:

Monday, June 28

Buffalo to Cleveland. Preliminary contests with various ship deck games. Equipment will be available during the entire cruise for those desiring to play cards.

Dancing every evening, beginning at 9 o'clock.

Tuesday, June 29

Toledo to Detroit, and Detroit River to Lake Huron.

Cards and deck games for those not attending meetings.

Afternoon set aside to give all an opportunity to view the beautiful scenery of Detroit River, Lake St. Clair and St. Clair Flats.

Evening, after dinner, community singing led by Tudor W. Jones of the Union Traction Company of Indiana.

Entertainment to be given by the children aboard the boat, under the supervision of Miss Rowell.

Wednesday, June 30

Afternoon, golf at Mackinac Island. Sightseeing trip for non-golfers.

Immediately after dinner, mixed *South American* bridge party, one hour.

Thursday, July 1

Golf in morning at Harbor Springs.

For non-golfers, *South American* will cruise down Traverse Bay, returning to Harbor Springs about 3 p.m. to pick up golfers.

Cards and deck games for those not attending meetings.

The Carpenter-Henry birthday dinner.

Dinner community singing led by Mr. Jones.

Immediately after dinner, "C.E.R.A. Derby"; E. M. MacIntosh, official judge.

Awarding of prizes for all events during cruise.

Dancing.

Friday, July 2

Ship docked at Benton Harbor 7 a.m. to 11:30 a.m. Sightseeing Benton Harbor and vicinity.

11:30 a.m. to 3:30 p.m., Benton Harbor to Chicago.

The Motor Bus in Urban Transportation*

Co-ordination an Essential—Rail Service Should Not Be Duplicated—Extent to Which Facilities May Be Used in Common Is Discussed

BY DEAN J. LOCKE
Staff Engineer Public Service Railway, Newark, N. J.

WHY, where, when and how should motor buses be used by street railways? It is safe to say that nearly all street railway men on this continent have had these questions to consider during the past two or three years. It has been a most serious problem with most of them. There are, however, many who now believe that they have taken the problem too seriously and by so doing have postponed or lost an opportunity to serve the public and have permitted others to poach upon a well-established business.

One of the principal reasons why street railways should use buses is that they may protect their investments. If they fail to utilize this newer form of transportation, competitors may become established. That the long-established system of transportation in a community should be the one to furnish all forms of public transportation is rapidly becoming accepted as a creed of the industry. We should consider ourselves transportation men rather than street railway men, and we should welcome the opportunity and assume the obligation, where possible, to serve our public in whatever way transportation service is needed. The public buys its transportation much as it buys its other commodities, and in so doing is nearly as fickle. We are learning what the merchant has always known, therefore we must offer what the public wants or a competitor will sooner or later find the way.

Where can motor buses best be used in urban transportation? The answer is—as integral parts of co-ordinated transportation systems. There are several places where their use has been found to be of benefit to the community and of profit to the operator, as follows: Feeder, extension and crosstown connecting service; non-competing or complementary service; de luxe service; tourist and charter service.

In each of these services volume of traffic largely determines the most economical form of transportation. Where the volume is small buses may be a valuable means of handling a business which would not justify rail construction. Where the volume of business is heavy the railway remains, and probably always will remain, the most reliable, practical and economical form of transportation. The dividing line between the economic fields of utility of the two types of vehicle may vary widely as between different properties, depending on local conditions.

*Abstract of a paper presented before the Canadian Electric Railway Association, Quebec, June 2-4, 1926.

PARALLELING EXISTING SERVICE UNECONOMIC

While one large railway is today operating in parallel with its trolley lines, bus lines which were originally established by competitors and which long established public demand requires should be continued, such a system is basically uneconomic. The problem there is to fit each type of vehicle into its most economical sphere as soon as practicable and to render satisfactory services without duplication of service and expense; in other words, to co-ordinate the services.

In many cities there are areas which receive what little transportation service they have by way of circuitous trolley lines. To such places the bus offers relief by means of an operation which is complementary to the railway service.

In the field of de luxe bus transportation there are great opportunities for street railways to develop a new and distinctive class of transportation. With routes properly chosen, with the right kind of equipment and with proper service a new patronage can be built up which will in no way poach upon the preserves of the older established business or compete with trolleys used for mass transportation of passengers.

When shall street railways employ buses to round out their transportation systems? Many of us are still seeking the answer. Others of us are convinced that in our search for the answer we have waited too long and have brought upon ourselves the plague of competition. However, the best answer is that we should anticipate demands and opportunities for bus service and be the first to render such service. This does not mean that we should rush in the moment a competitor appears on the horizon, but rather that we should so cultivate public opinion that we will be sought out when legitimate needs for transportation service arise and fly-by-night operators will receive no encouragement.

The operation of buses by railways can often be undertaken to advantage when costly rail extensions of uncer-

tain or low earning power are demanded or when the rehabilitation of branch or feeder lines becomes necessary because of physical depreciation or the improvement of adjacent highways. Another opportunity for the use of the bus arises when the operation of a trolley line becomes burdensome because of diminishing business. The substituted bus may, because of its popularity and its flexibility, build up and hold a new business of its own which the trolley never could secure.

We hesitate to abandon unprofitable rail operations because of the capital invested in the fixed rights-of-way, tracks and power generation and distribution facilities. An investment in bus equipment is not fixed in the same sense, and if a bus operation proves to be unprofitable we can abandon it and use the equipment elsewhere without loss of capital. It may be better to suffer a small loss from a bus operation installed in advance of a threatened competitive operation than to suffer a large loss by reason of the existence of the competitor.

Fields for Bus Service

How shall motor buses be used by street railways? First, careful consideration should be given to the selection of the buses themselves. They should fill service requirements and at the same time operate economically. Only the best equipment should be employed, of designs which will provide attractive accommodations for patrons, which will give uninterrupted service and which will not be expensive to operate and maintain. Buses are now being built which can handle the peak loads imposed upon them during rush hours to the extent of 125 per cent of their seating capacity, but their use is generally not justified except where the rate of fare is low and the ride is short.

Character of service largely determines the design. When buses are to be used as an adjunct to and co-ordinated with street railway service, such as in feeder, crosstown and complementary service, they should be painted the car colors and everything else possible should be done to identify them with the railway system. Bus operators should wear the same kind of uniform as the trolley operators. The railway transportation departments should control the operation of such buses.

On the other hand, where the bus service is non-competitive and is not complementary to the railway—that is, where a preferred service is offered—the buses should be distinctive in color and appearance and should be operated separately. The passenger should be made to feel that he is getting a higher class of service than is available to him on the railway bus. However, the bus chassis and body may be the same for both types of service. In fact, interchangeability and standardization of units for maintenance make this highly desirable.

Volume of traffic and frequency of service have great weight in determining the size of bus to use. On lines which have heavy peak loads with standees, the most economical size to use during the peaks is the largest capacity bus which can be maneuvered in traffic, but for many hours of the day smaller buses would be amply large. Because the carrying charges on the investment generally constitute a smaller part of the cost of bus service than of trolley service, it may pay to provide large capacity buses for use during rush hours and additional smaller buses for use during non-rush hours. Many operators find it desirable to standardize on one size of vehicle. In such cases the relative duration of the rush and non-rush periods may determine the most economical size to use. There is a definite field for the smaller bus with its lower operating costs, such as on lines where comparatively frequent headways are desirable but where the traffic is light. If the smaller vehicle is continually overloaded (a common danger) the cost of repairs, depreciation, tires, gas and oil may nearly equal that of the larger bus.

Never was the application of the old adage "a stitch in time saves nine" more justified than in connection with the maintenance of buses. Unquestionably the "stitch" is regular, frequent and adequate inspection, incorporating generous lubrication and a high standard of cleanliness. This is the everyday preventive medicine which we must give the bus if we are to keep it on the road and out of the repair shop.

But if we are to operate effectively we must organize for efficient and economical maintenance beyond inspection. On a large system it is highly desirable to have: Standardized equipment; an experienced superintendent of bus maintenance; a centrally located repair shop well equipped with machinery for the overhaul and repair of buses; a system for the rapid and careful purchase and distribution of materials and supplies; a uniform and complete system of cost accounting.

Methods for Co-ordinating Services

On almost every property, regardless of size, there are opportunities to effect economies in operating costs of both the railway and the bus branches of the business by co-ordinating the managerial, operating, maintenance, purchasing and accounting departments of the two, which would necessarily have to be self-sustaining in each company if the services were independent.

Beginning with the managerial organization, we find that the general manager of the railway, the general office staff and the various railway department heads and their staff usually absorb the direction of the bus operations, and that the total cost of these services for the two operations is but little greater than that of the railway alone. In the transportation department the degree to which bus operations may be absorbed depends largely on whether or not both trolleys and buses are operated from the same house or houses. Where buses can be operated from carhouses or near-by garages the stationmaster's or supervisor's organization can often absorb the direction of bus operators and the bus clerical work with but little increase in staff. Where the garage is distant from a carhouse, additional supervisors and receiving clerks may have to be provided.

Street railways, when adopting buses, are frequently able to utilize for housing facilities railway property which has long been idle or not fully utilized. A bay or two of a four-bay carhouse or an old power house can frequently be adapted to bus uses at comparatively small expense.

The extent to which the maintenance facilities for railway cars and buses can be co-ordinated depends largely on local conditions. Certain kinds of inspection and maintenance work employing carpenters, painters, upholsterers, farebox and register repairmen, blacksmiths, machinists, etc., are practically the same for both types of vehicle, while the electric motors, controllers, brakes, trucks and wheels of trolley cars and the engines, transmissions, axles and chassis appurtenances of buses each require a separate corps of specialists. On small properties it usually is not economical to have separate facilities and organizations for the two kinds of work, but on large properties, where hundreds of trolleys and buses are operated, it is possible and often advisable to specialize to a large extent.

Inspection work usually merits a separate personnel, even on small properties, because of the highly specialized and exacting nature of the work. Car and bus cleaning crews may be combined or not, as local conditions may demand.

The cost accounting and auditing of bus operations by street railways present few new problems, and the work is usually absorbed by enlargement of the railway clerical force.

The use of the motor bus in co-ordinated transportation is in its infancy, and much still remains to be done in perfecting its design and its operation. If properly used, it will help solve our traffic problems and some of our financial ones, and will be of distinct benefit to the public. Improperly used, it will only increase the public's and the operators' burdens.

American Association News

Merchandising Transportation

ON MAY 21 the merchandising transportation committee held an all-day session at the association headquarters in New York, editing and discussing the work of the eight sub-committees delegated to write the various chapters of the committee report. Certain sections were revised by action of those members of the committee present and it is planned to get the section into final shape immediately so that the report can be completed at the next meeting to be held in the middle of June.

Those members present were R. N. Graham, chairman; O. A. Broten, J. B. Donley, John A. Dewhurst, Ralph W. Emerson, S. E. Emmons, E. A. Palmer, Clinton D. Smith, A. C. Spurr, J. C. Thirlwall, W. H. Boyce and G. C. Hecker, special engineer of the association.

The News of the Industry

More Trackage for Key System

Application has been made to the California Railroad Commission by the Key System Transit Company, Oakland, for permission to construct a viaduct as an approach to the Key Mole in order to afford more trackage and to speed up traffic to and from San Francisco. The cost of the new project has been estimated at $1,246,450. It is further estimated that the new plan will adequately care for 40 per cent more traffic than is accommodated under the present plan. The engineers propose to make the new viaduct 4,840 ft. long, with 10 per cent grades.

Two new main line tracks will be built, if the application is approved, to connect with the present main line tracks at a point just east of Hollis Street in Oakland and to cross over seven Southern Pacific tracks and one set of Santa Fé tracks. All four main line tracks are to be connected by right and left hand ladders at the west end of the viaduct for emergency use.

A significant feature of the proposition is that it would be useful in any new plan for a new terminal layout to Goat Island shoal or for a bridge on the Goat Island-Telegraph Hill location.

The installation of two additional main line tracks will bring about reduction in time. Under the present schedule the interval of time between the arrival or departure of the last train that connects with the same boat is seven minutes during rush-hour periods. It is estimated that with four main line tracks this interval can be lessened by at least half. This congestion of trains under the existing two-track outlet plan has long been a problem for Key system engineers. They have made an intensive study of the problem and now declare that the viaduct proposal is a long step toward the solution of it.

A normal daily movement on the six lines of the Key division and the San Francisco-Sacramento Railroad is about 400 trains to and from the mole. This number is reduced by about 100 trains by the consolidation of trains of four divisions.

Another proposal that is being studied is the proposition to "stagger" the Southern Pacific and Key ferry schedules. At the present time the schedules which are in effect are practically identical.

Richmond Common Council Overrides Mayor's Franchise Veto

Mayor J. Fulmer Bright's veto of the Virginia Electric & Power Company's blanket traction franchise was overridden by the Common Council of Richmond, Va., on June 7 by a vote of sixteen to two. The vote was taken after a fifteen-minute talk by the Mayor, which he termed a supplementary statement, and which, he said, was largely a repetition of the language used in his veto message. During his argument, he said that he was persuaded that the traction company could pay the present rate of tax and prosper without increasing its carfare. It had been done in the past, was being done now and could be done as long as present conditions obtained. He believed that if the tax rate were reduced to the extent proposed in the blanket franchise "you will face a condition which may necessarily result in making up the loss the city will sustain from other sources and other taxpayers." The issue now goes to the Board of Aldermen for concurrence.

St. Louis Files Answer to Fare Request

City Counselor Suggests Deferment of Increased Fares Until Completion of Present Transfer Negotiations—Receiver Wells Explains Decrease in Traffic

THE 8 per cent return on the fare basis valuation of United Railways, St. Louis, Mo., is an excessive demand, higher than the return allowed electric railways in other cities and quite unwarranted by the present condition of the money market, City Counselor Muench of St. Louis informed the Missouri Public Service Commission in an answer of the city protesting the granting of an application made by Receiver Rolla Wells for an increase in fare to 8 cents, two tokens for 15 cents. The present fare for adults is 7 cents straight. The protest was sent to Jefferson City on June 5. Receiver Wells filed his application on June 3.

Counselor Muench said that the injury and damage reserve of 9 per cent of gross receipts was much beyond the reasonable amount that should be set aside for that purpose, and before allowing such a percentage the commission should make a careful investigation to determine to what extent such heavy damage claims are the result of bias or lack of sense of civic obligation. The unfavorable showing in the company's financial status for 1925 compared with other years and with the first four months of 1926 indicates that the maximum inroads on the business of the company have passed and the present business has taken a favorable turn, according to the city.

Mr. Muench further points out that in the very near future the United Railways property will be transferred to the reorganization committee's St. Louis Public Service Company and that this change will strip the company of various legal hamperings and make for an elimination or reduction of certain fixed charges and for greater economy. In view of this fact he terms the grant of an order for a fare raise "inopportune and illegal." If a fare raise is found to be absolutely essential it should only be granted after the reorganization of the company and the transfer of the railway property have been completed and the financial affairs of the St. Louis Public Service Company adjusted and stabilized.

Continuing, Counselor Muench asserts that the reason for the deficit of $207,000 experienced by the company last year does not lie with the lines in the city, but was caused by the nonpaying offshoots of the city lines, and that it would be manifestly unfair to place upon the city car riders the burden of carrying the expense of arteries that stretch into the county and cause red ink entries on the company books. Attention is called by him to an item of $4,891,032 which is said to represent the net amount of the company's investment alleged to have been made for betterments and additions of the property between Jan. 1, 1919, and April 30, 1926. He contends that this is in excess of the amount.

In concluding his reply Mr. Muench again asks for an audit, even though the commission should decide that the company is entitled to an immediate increase in fare; he urges this so that a true value of the company's property may be established to form the basis of the finding the commission will be required to make in connection with the service-at-cost franchise now being negotiated by the city and the reorganization committee.

In his application for the increase Receiver Wells asked for immediate action by the commission and that the fare of 8 cents, two tokens for 15 cents be effective not only in the city but in each of the St. Louis County fare zones. Receiver Wells made his application with full authority from United States District Judge Faris, who has jurisdiction over the receivership.

United Railways officials have estimated that the increase if granted will net the company upward of $1,200,000 additional revenue annually. For the year ended April 30, last, the net income was $2,748,000, or about $1,200,000 of the amount required to pay a 7 per cent return on the $56,600,000 valuation fixed on the company's property by the Public Service Commission. However, no rate of return on this valuation has ever been fixed by the commission, and in his application Receiver Wells asked for an 8 per cent return, which would require upward of $2,000,000 a year more revenue.

Receiver Wells issued a statement to

explain to the public his request for a higher fare. He cited a large decrease in the number of revenue passengers due to the increased use of private automobiles and competition of buses and service cars. He said the number of passengers in 1924 was approximately 13,500,000 less than in 1923 and in 1925 9,100,000 less than in 1924.

This combination of decreased income and increased expenses "makes it impossible to maintain the high character of service desired, make further improvements in service and pay a reasonable return on the valuation of the property allowed by the Public Service Commission and agreed to by the city and the receiver."

"In view of this situation the receiver has felt it necessary, in connection with the property maintenance of the service and in protection of the equities in the property, to apply to the Public Service Commission, and he has been instructed by the United States court to apply to the Public Service Commission for increase in fares to a basis of tickets at the rate of 7½ cents and single cash fares of 8 cents. However, he is not now asking for an increase in the present children's fare of 3 cents," Receiver Wells' statement concludes. In view of the action of Receiver Wells it is considered probable that Mayor Victor J. Miller will immediately give out for public consideration and discussion the new service-at-cost franchise under which the St. Louis Public Service Company will operate when it takes over the street car property, in the hope that the public may help to decide on points now in controversy. Briefly, these are: Whether franchise shall regulate terms and conditions under which the company will employ its workers, especially carmen; whether the use of one-man cars shall be prohibited on lines entering the congested districts of the city; whether the mill tax and present franchise taxes shall be continued, and what rate of return the company shall be permitted to earn on both its present investment and further investments for extension of service.

Appropriation for Loading Platforms in Chicago

Substantial appropriations for the establishment of street car loading zones in every section of Chicago have been recommended to the city finance committee by the local transportation committee of the City Council. The action came after traffic experts had reported that present facilities for loading trolley riders safely were inadequate. A representative of the Chicago Surface Lines offered similar testimony and strongly urged the establishment of safety islands. He opposed the construction of elevated zones, especially in the Loop district, as a hindrance to heavy vehicle traffic.

The tentative plan of the committee's engineers for making zones is to install strips of 1-in. yellow rubber vulcanized under enormous pressure upon steel plates ¼ in. thick and imbedded in the road flush with the level of the pavement. It was declared that the rubber will withstand wear much better than enamel or other materials.

Ordinance Introduced Before City Council

Proposed Franchise for Kansas City Incites Kansas City, Kan., Mayor to Express Views on Equal Consideration—Public Will Be Invited to Hearings

IN ORDER to bring the matter of a new street railway franchise to the point of public discussion, the application for a new 30-year franchise, as submitted to the city manager recently by William G. Woolfolk, president of the Kansas City Public Service Company, Kansas City, Mo., was introduced into the City Council in the form of an ordinance on June 7 in the name of Councilman A. N. Gossett. Mr. Gossett said the franchise is one of the most important questions confronting the city government and thought the introduction of the bill at this time proper in order to allow its discussion by a Council committee and in public hearings. He said:

> Public hearings on this matter are a necessity, so that some plan resulting in the introduction of an agreeable ordinance may be reached. If the Council finds that the ordinance is not right, or that the franchise should be granted by the people, then I would not be for this ordinance.
>
> However, I believe the matter is one that should receive the serious consideration of this Council.

The public will be invited to attend the informal hearings by the Council.

It is rumored that the Kansas City Public Service Company, the successor under reorganization to the Kansas City Railways, will meet with quite a little opposition in the matter of the ordinance as introduced. Several Democratic Councilmen were on hand at the introductory meeting for the purpose, it is said, of killing the bill without public hearings. This plan was sidetracked, however, in favor of public hearings.

Company Has Complied with New Terms

Mr. Woolfolk said that several times recently the statement has been made that the Kansas City Public Service Company, the successor to the Kansas City Railways, should not ask for a new franchise until the company has complied with the provisions of the present grant. "I have made a close study of what the old company has done," he said, "in the way of complying with its franchise requirements and I believe in all fairness it should be made public. Our books are open to prove all I state."

Mr. Woolfolk, in this connection, recently issued a statement wherein was set forth a number of figures showing the manner in which the old company has more than complied with the terms of the present franchise, especially in the matter of extensions to the Missouri property of the company, the purchase of new cars within the stipulated periods and the full provision of $250,000 which should be available for further extensions deemed necessary by the city. The text of the statement admits the failure of the old company to comply fully with the provision requiring full maintenance of the paving between the car tracks. Mr. Woolfolk said that his company stands ready to remedy that condition, which he justifies in the face of the financial difficulties into which the old company found itself within a few years after the present franchise was granted.

According to the statement, the ordinance further provided that if the net earnings of the company in the aggregate exceeded, or were less than 35 per cent of the gross receipts of the company in any year, then the amount to be expended in extensions and additions to the property should be increased or diminished correspondingly, and that an analysis of the company's earnings and expenditures in extensions up to Dec. 31, 1925, shows the capital additions to the company's property in the period amounted to approximately twice the franchise requirement.

Old Objections Revived

H. F. Schaible, acting Mayor of Kansas City, Kan., said that this city must receive equal consideration with Kansas City, Mo., in franchise negotiations with the new operators of the railways. He announced that he will ask the commissioners to call a conference with officials of the Kansas City Public Service Company and of the Kansas City Railways for consideration of the proposed franchise.

Mr. Schaible is quoted as saying that not a line of track had been extended in Kansas City, Kan., for more than ten years, and virtually every request for adequate service and routings that would benefit Kansas City, Kan., had been ignored. He said thousands of laborers working in the central industrial district were forced to walk blocks to and from work as a result of the abandonment of the "L" road.

Several of the objections voiced by Mr. Schaible have for several years formed the chief bones of contention between the Kansas City Railways and the officials of Kansas City, Kan., the latter having fought the granting of articles of incorporation to the Kansas City Public Service Company by the Kansas board at the time such approval was requested. The objections at that time, however, were over-ruled by the board after company officials promised to do everything possible in coming to a satisfactory agreement with the city officials and public in the matter of service, fares and equipment.

Sandston Electric to Operate in Virginia

The Sandston Electric Railway, Richmond, Va., with a capital stock of from ten shares to 50 shares without par value, has been granted a charter by the Virginia Corporation Commission to operate a street railway at Sandston, Va., about 5 miles northeast of Richmond. The incorporators are Oliver J. Sands, president of the American National Bank & Trust Company, president; J. B. Bourne, secretary. Other officers are J. A. Baird, Samuel W. Zimmer, Petersburg, Va.; Oscar E. Parrish and Robert M. Sharp, Richmond, Va.

Litigation Ends in Shreveport

Court Rules Company May Charge Straight Seven-Cent Fare—Details in the Long Battle Reviewed

The United States District Court, Eastern District of Louisiana, handed down a decision recently declaring null and void and confiscatory the order of the Louisiana Public Service Commission, rendered on March 16, 1925, ordering the Shreveport Railways, Shreveport, La., to offer seventeen tickets for $1 and four tickets for 25 cents. The new order authorizes the company to discontinue the sale of four tickets for 25 cents and seventeen for $1, and to charge 3½ cents a ride for school children during school terms and school hours. The court also ordered an injunction restraining the Louisiana Public Service Commission, Huey P. Long, chairman of the commission, and other members from attempting to enforce the said order of March 16, 1925, or from interfering in any way with the plaintiff in charging and collecting a 7-cent fare on the street railway systems and a 3½-cent fare for school children who are under the age of eighteen years.

This decision ends litigation which has been carried on for some three years between the Shreveport Railways and the courts. A review of the preceding events is necessary for a proper understanding of the situation in that city. The Shreveport Railways has been fighting for the principle of operation with a profit instead of a loss, and has from time to time applied to the Public Service Commission for relief. In January of this year the company asked to be relieved of the sale of tickets and to be allowed to charge a flat 7-cent adult fare and 3½-cent, or 35 cents for ten tickets, school children rate. The application included a statement of the company showing a deficit of $2,987 for the year, allowing nothing for a return on the value of the property. The commission did not grant a hearing until April 26. After the hearing the chairman stated the case would be continued indefinitely.

A delay of three months with losses continuing monthly compelled the Shreveport Railways to apply to the United States District Court for an order restraining the Public Service Commission from interfering with the railway in discontinuing the sale of adults tickets seventeen for $1 and four for 25 cents and granting the railway the right to charge all adult passengers a 7-cent fare and ten school tickets for 35 cents.

Trouble began in Shreveport in July, 1923, when the United States District Court for the western district of Louisiana granted the Shreveport Railways an injunction against the Louisiana Public Service Commission restraining it from interferring with the company in the collection of a 7-cent cash fare. In November of the same year a committee of Shreveport citizens prevailed upon the Shreveport Railways to withdraw its suit in the United States District Court and accept an order of the Louisiana Public Service Commission fixing the fare of 6 cents for adults and 2½ cents or ten tickets for 25 cents for the school children. This was done with the understanding that if this rate of fare did not yield a fair return on the property the commission would increase the rates. After one year's test of this rate of fare it was found that the earnings did not yield a fair return. The Shreveport Railways, therefore, made application to the Public Service Commission for an increase in fare to 7 cents for adults and 2½ cents, or ten tickets for 25 cents, for school children.

In March, 1925, the Public Service Commission issued an order fixing the cash fare at 7 cents, but required the company to sell tickets seventeen for $1 and 4 for 25 cents. The price of school tickets remained unchanged. The Shreveport Railways did not feel that this rate would yield a fair return, but it agreed to try the arrangement and see what the results would be. The earnings under this arrangement dropped off immediately and it found it was operating at a loss each month.

Another angle to the dispute is the 1907 ordinance requiring a motorman and a conductor on each car operated in Shreveport. Some ten years later, after the one-man safety cars had passed the experimental stage, the railway contested the right of the city to enforce this ordinance. The case went to the Supreme Court of the State and to the Supreme Court of the United States, where it was held that the ordinance was a police regulation and the courts did not at that time feel justified in interfering with it. Since that time the railway has secured a modification of the ordinance so as to permit one-man safety cars on two of its lines.

64 per Cent of Cleveland Shoppers Use Street Car

Three-fourths of the shoppers in Cleveland's downtown Euclid Avenue stores make the trip from their homes in street cars or buses operated by the Cleveland Railway. This is shown by a traffic survey conducted by the Cleveland Railway and the retail merchants' board of the Chamber of Commerce.

Less than 4 per cent walk to the stores, a little more than 21 per cent come in their own automobiles, more than 64 per cent come by street cars and a little more than 10 per cent by buses.

According to Ralph W. Emerson, general manager of the railway, the poll was perhaps the largest of its kind ever taken in this country. It was conducted in the downtown Euclid Avenue stores.

Mr. Emerson is inclined to believe that thousands from the poorer neighborhoods failed to vote or refused to do so, and that they would show an even higher percentage of car riders. He also believes that shopping districts away from Euclid Avenue probably would show more car riders. A total of 93,355 persons voted in the poll.

William H. Gray, secretary of the retail merchants' board, declared the survey showed the buying public depends principally on the Cleveland Railway for transportation.

Utica Fare Hearings Concluded

Hearings were completed by the Public Service Commission on June 10 upon the petition of the New York State Railways for permission to increase fares in its Utica zone. The city of Utica was given until June 21 to file a brief. Counsel for the company stated that no brief would be filed by it.

After cross-examining engineers of the company concerning their appraisal of the Utica zone property, the city of Utica opened its case by presenting Dr. Milo R. Maltbie, consulting expert, and two members of his staff. The city claimed a reproduction cost of the property in the Utica zone as of Sept. 30, 1925, of $3,854,255, from which there was deducted for depreciation $1,462,-823, giving a net reproduction cost less depreciation of $2,391,431. This figure is exclusive of overhead costs.

At the last hearing the engineers of the Public Service Commission estimated the reproduction cost as of Sept. 30, 1925, at $5,325,517 without depreciation and at $3,359,384 after depreciation had been deducted.

Surface Lines Head Attacks Proposed Traction Ordinance

Taking exception to the opinion expressed by Francis X. Busch, corporation counsel of the city of Chicago, in an address before the Chicago Association of Commerce (referred to in the ELECTRIC RAILWAY JOURNAL, issue of June 5, page 988), Henry A. Blair, president of the Chicago Surface Lines, in a letter to the chairman of the City Council committee on local transportation on June 9, declared that the question of subway construction should be settled before any attempt is made to draft new traction ordinances. Mere unified operation of the surface and elevated lines could not materially improve service until congestion in the Loop district had been relieved by subways. Mr. Busch had previously stated that subway construction could not be undertaken until other phases of the traction problem had been thoroughly investigated and acceptable ordinances drafted.

As to the proper method of financing subway construction, Mr. Blair said that subways should be built by the city because the cost of construction was too great to be met out of earnings of the transportation company without considerably increasing the rate of fare. Earnest consideration should be given the question of whether the present law with reference to special assessments needs clarification or enlargement. Consideration should also be given to the restriction in the present law which prohibits the city from leasing subways for a longer period than twenty years.

Mr. Blair asserted that before the ordinances be made effective they must be submitted to a referendum vote of the people. But even if the people should give their approval, legislation must be then obtained which will compel the state to surrender to City Councils all regulatory power, which will validate the removal of the present twenty-year limitation of the right of cities to issue grants to street railways.

District Commission Wants Information on Suggested Merger

Another request from the Public Utilities Commission as to what progress, if any, has been made toward a merger of the two transportation systems of the District of Columbia has been sent to the Capital Traction Company and the Washington Railway & Electric Company. Indicating that further delays might result in indefinite postponement of negotiations, the commission in a letter to both companies said:

> In view of the short time intervening between the adjournment of Congress and the present time, the Public Utilities Commission desires to know what progress, if any, has been made toward the proposed merger of the two railways since the last congressional hearings on this matter.
>
> This information is asked because the commission believes not only that it is necessary because of its possible influence on future actions of the commission, but also because it is felt that the Senate and House district committees should receive this information before the present session of Congress adjourns.

John H. Hanna, president of the Capital Traction Company, said that officials of his company had conferred with the North American Company, large stockholders in the railway.

William H. Ham, president of the Washington Railway & Electric Company, declined to comment on the letter.

Council Refuses Ten-Cent Fare in Atlanta

The request of the Georgia Railway & Power Company for a 10-cent cash fare, relief from the gross receipts tax levied by the city and permission to charge 2 cents for transfers was denied on June 7 when the City Council, by a vote of 22 to 2, adopted the report of the special committee appointed to study the "special relief petition" filed by the company two years ago. The Council recommended, however, that the charter of the city of Atlanta be amended by the state Legislature at its next session so that paving costs chargeable to the street railway may be fixed upon a basis of 12 ft. instead of 16 ft. for double-track and 8 ft. instead of 12 ft. for single-track lines, which the company is now paying. It was further recommended that the maximum paving costs chargeable to the company for the year 1927 be fixed at an amount not to exceed $75,000 and that at the beginning of each year hereafter a maximum amount be fixed by the proper authorities so that the railway may know the amount it will be required to pay.

The refusal of the City Council to allow a 10-cent cash fare with a 2-cent charge for transfer does not, however, mean that this relief cannot be obtained. The Council simply considered that changes in fare should be made by the Public Service Commission, and left it up to the company so to petition before the proper authorities.

Out of the seven requests contained in the original petition, made by the Georgia Railway & Power Company two years ago, three have been granted, three may possibly be granted in the near future and only one has been denied. Requests granted have been the elimination of unfair jitney competition, permission to reroute many cars and eliminate many stops in the interest of speeding up service, and more rigid enforcement of the city's traffic regulations. The three requests which have not yet been granted, but on which the way has been left open, are those for reduced paving costs, a 10-cent cash fare and a 2-cent charge for transfers. The only request thus far specifically denied is that for relief from the gross receipts tax levied by the city.

Baltimore Hearings Concluded

The Maryland Public Service Commission has completed its public hearings on the proposed rerouting of a number of the street car lines in Baltimore operated by the United Railways & Electric Company. The commission gave three days to hearing both sides of the subject and has taken the case under consideration.

Changes in the car routes were recommended by Kelker, DeLeuw & Company, Chicago engineers, who made a survey of the city. These recommendations were approved by the Baltimore Traffic Survey Commission, which, in turn, submitted them to the Public Service Commission with the request that the United be ordered to make the proposed changes. It was on this request that the Public Service Commission held open hearings. These were attended by representatives of numerous merchants' associations which opposed the removal of street cars from some of the business streets. The merchants also submitted an alternative plan, which proposes that certain changes be made in routing.

H. D. Potter, general manager of the United, testified at the hearing on the closing day. He pointed out that the company is in accord with the Traffic Survey recommendations with the exception of some details. A statement also was made by Charles D. Emmons, president of the company. He pointed out that the company said last year when the valuation case was under consideration that it would try to work out its financial problems under the existing 7½-cent fare, and although it has prospered there has not been sufficient leeway to permit large expenditures for rerouting unless there is assurance that the changes will be advantageous to both the company and the riding public.

When the hearings were opened on June 1 representatives of several merchants' organizations were present and protested the proposed changes in several of the routes that had been recommended by the report. C. D. Emmons, president of the United, pointed out that the rerouting would not result in any great savings in operating costs.

Explanation of the good to result from adopting the proposed changes was presented by Major R. F. Kelker, Jr., of the Chicago engineering company. He also cited the advantages of the removal of car lines from certain downtown streets.

The Baltimore Traffic Survey Commission adopted the vehicular traffic survey report as a tentative plan.

Under the plan as adopted by the commission all parking in the downtown business section of the city would be eliminated between 7:30 and 9:30 a.m. and 4:15 and 6 p.m. daily except Saturdays and holidays. It is recommended that parking be prohibited between 12:30 and 2:30 p.m. on Saturdays. Recommendation also is made that parking be prohibited during the rush hours on some of the streets leading into the business section, only the side of those streets affected by the greater flow of traffic being involved.

Angular and perpendicular parking during the day on streets less than 60 ft. wide in a large part of the downtown section is opposed.

It is said that the territory exempted in the business section will provide parking space for the parking of 2,000 cars during the rush hour and 5,000 at other times.

The report of the experts making the survey also recommends that a number of streets or portions of streets be made through streets, before entering or crossing which automobiles would be required to come to a full stop.

P.R.T. Now Aids Its Stricken Foe—the Private Automobile

Under the guerdon of the Philadelphia Rapid Transit Company, the Yellow Cab Company, Philadelphia, is entering the towing business. Killing two birds with one stone, the company is making use of a number of old taxi bodies remodeled for this purpose and is at the same time establishing a new criterion for comprehensive transportation service in the city which it serves. So far as is known, there has been no example in this country prior to this new departure on the part of the Philadelphia company of towing service in which standard meter rates have been affixed. It is hoped to drive the towing "pirate" off the street with the Yellow service provided by the P.R.T.

Six of these towing trucks have been placed in service. They are stationed in various parts of the city so that rapid response to calls may be made at any hour of the day or night. Crippled cars will be towed to any point designated by the owners or drivers. The meter flags are thrown as soon as the towing truck reaches the car. It remains down in a recording position until the car has been landed at its destination and the towing truck dismissed. The charge for the first mile or fraction thereof is $2, each additional mile or fraction thereof is charged for at the rate of 50 cents, while waiting time, each ten minutes or fraction thereof, impresses another charge of 50 cents.

It is of course necessary for the Yellow Cab division of P.R.T. to keep towing trucks on hand for servicing disabled cabs and the public towing service started recently makes it possible greatly to reduce overhead charges by providing for the trucks a service more or less continuous. In a leaflet issued by the Yellow Cab Company, dealing with the new towing service, it is stated that as the volume of towing business increases rates for the service will be reduced. Even at the present time, however, it is claimed that the rates are lower than those of any other towing medium in Philadelphia.

Survey Shows Bus Is Not Replacing Electric Railway

Lucius S. Storrs, managing director of the American Electric Railway Association, states that buses are increasing the local transportation service throughout the United States, but not supplanting electric railway cars in any marked degree. The traction companies are rendering 15,000 miles more service today than six years ago and adding 5,500 buses and 2,658 cars. Since 1915 buses have supplanted only about 2,000 miles of track, mostly in sparsely settled sections. More than 300 electric railway companies are utilizing the bus in the place where it belongs—that of giving supplementary service. Routes operated embrace more than 12,250 miles with some 6,000 buses. Most of this service is over new routes. Electric railways during the last year carried approximately 16,000,000,000 passengers, or about 43,000,000 a day.

At best all of the buses, including the 6,000 run by electric railway companies, probably carried one-eighth as many riders as the electric lines. There is no indication that the electric lines are going to be seriously affected in urban centers by the bus, but there is every indication that the electric railways will continue to use the bus as a helpful supplemental agency. The fact that no city of more than 50,000 is being served exclusively by buses proves the necessity for the street car.

Demands of Indianapolis Men Announced

Harry B. Dynes of Indianapolis, a commissioner of conciliation of the United States Department of Labor, has been assigned by the department to observe the street car situation in Indianapolis, Ind., following reports that some employees were considering a call for a strike.

Word of the appointment was received following a meeting of approximately 500 employees of the Indianapolis Street Railway.

John M. Parker and Robert Armstrong, the association organizers, attended the meeting, but did not address the employees. They had been enjoined by Judge Robert C. Baltzell of the United States District Court from continuing their organization work which in any way interfered with employees.

Demands of the association have been placed before company officials, it was said by Mr. Barker. Their demands call for an increase in wages, reinstatement of several men said to have been discharged by the company because of their allegiance to the labor organization and settlement of all disputes between employers and employees by arbitration.

The wage scale sought is as follows: For the first three months, 55 cents an hour; next nine months, 60 cents an hour; after first year, 65 cents an hour. An additional 5 cents an hour to the regular scale is asked for men employed on one-man cars and buses. The present scale of wages is 37 cents an hour for the first year, with an increase of 1 cent a year for five years, after which there is no change.

The demands would have all labor disputes first discussed in conferences; this method failing, arbitration by a board selected by both parties would be called into play.

James P. Tretton, superintendent of the car company, said that the scale demanded by the union would mean approximately $2,000,000 a year increase in wages for the company.

News Notes

Will Run Mozart Line Another 30 Days.—The City Council of the city of Wheeling on May 25 voted to permit the Wheeling Traction Company to operate the Mozart Park traction system for an additional 30 days pending a report of the franchise committee. The time extension becomes effective on June 15. The Wheeling Traction Company assumed operation of the line when it was abandoned by the Wheeling Public Service Company, at which time it was suggested that the line be taken over for a test.

Seeks Fare Increase. — The Denver Tramway, Denver, Col., is seeking permission of the Public Utilities Commission to increase its rates between Denver and Arvada to 50 rides for $2.25 because an improvement in service has been sought by the patrons. Some time ago, in an effort to stimulate riding between Denver and Arvada, the company reduced the rate from Lakeside, the city limit of Denver, to Arvada, making the fare 50 rides for $1.66. The line was not used enough to justify the running of one car every hour.

Injunction in Favor of Railway Continued. — United States Judge W. C. Lindley at Danville, Ill., on June 5 continued the temporary injunction granted the East St. Louis Railway against the city of East St. Louis, Ill., and city officials restraining them from tearing up the company's tracks on Third Street between Broadway and Missouri Avenue. Judge Lindley set the final hearing for June 25, at which time the court shall determine whether the city of East St. Louis or the Illinois Commerce Commission has the authority to renew the franchise for the tracks in question. The old franchise expired at midnight May 31.

Wage Agreement Renewed. — The Toronto Transportation Commission, Toronto, Canada, concluded an agreement on April 17 with its platform employees for two years from April 1, similar in all important respects to that in force during the two preceding years. The request of the employees for two weeks holidays was refused on the ground that employees paid at an hourly rate and in receipt of additional pay for overtime were not, as a rule, granted holidays with pay.

Contract Renewal Prevents Wage Cut.—An amicable settlement was arranged recently between the Amalgamated employees and officials of the Michigan Electric Railway, Jackson, Mich., by which the men have agreed to work for the next two years under the same contract that has been in force the past two years. The rate of pay that they will continue to receive is 49½ cents an hour for interurban motormen and conductors for the first six months and 54½ cents an hour thereafter; 44½ cents an hour for the motormen and conductors of the two-man city cars for the first year and 47½ cents thereafter; 49½ cents an hour for the one-man city car operators and bus drivers for the first year and 52½ cents an hour thereafter. The union had demanded 5 cents an hour increase in payment, time and a half for overtime and the inclusion of the bus operators of the Southern Michigan Transportation Company under its charter. The status of the bus operators, decided by arbitration, was discussed in the ELECTRIC RAILWAY JOURNAL, issue of May 22, page 902.

Ordinance Provides for Experts in Fare Case.—The Albany, N. Y., Common Council has passed an ordinance authorizing the employment of experts, engineers and accountants to assist in the preparation and presentation of the city's case in the matter of the application of the United Traction Company for an increased rate of fare. The sum of $35,000 was appropriated.

Detroit Wage Conferences Not Scheduled.—No definite date has been set for the conference between officials of the Department of Street Railways, Detroit, Mich., and officers of the street railway men's union on the proposed new wage scale and changes in working conditions submitted by the men recently. It is understood that the matter is being held in abeyance pending investigations being made by accountants for the Detroit Street Railways to determine just what the demands made by the men mean in increased costs.

Commission Hears Higher Fare Petition.—The Missouri Public Service Commission at Jefferson City, Mo., on June 3 heard testimony for and against the granting of the application of the Hannibal Railway & Electric Company, Hannibal, Mo., for authority to increase its fare from 6 cents to 8 cents with two tokens for 15 cents. The commission was told that the company is operating at a loss under the present 6-cent fare, that buses have made considerable inroads into company revenue and the increase sought is absolutely necessary if the company is to continue operations and obtain a fair return on its investments. The petition of the company was referred to in the ELECTRIC RAILWAY JOURNAL, issue of May 29, page 945.

Men Seek Increase in Wages.—The carmen in the employ of the Eastern Massachusetts Street Railway, Boston, Mass., have asked for an increase in wages of 16 cents an hour, a wider spread in the differential for the one-man car operators and a reduction of the working day to eight hours. The present rate is 61 cents an hour for motormen and conductors on two-man cars and 66 cents an hour for operators of one-man cars. There have been several conferences over these demands, and the matter is to be submitted to a special arbitration board within a few days. A year ago the men received an increase of about 3 cents an hour.

Foreign News

British Service Normal

General Working Agreement in Effect Prior to Strike Succeeded by Variety of Local Settlements

All over Great Britain tramway and bus services were restored to normal within three or four days after the end of the general strike. Here and there delays were caused by settling the terms of reinstatement. In many towns the tramway and bus authorities, with the aid of volunteers, were able to maintain skeleton services during the strike, although in certain places there was practically complete stoppage. In the case of some of the smaller undertakings the employees did not belong to a trade union and the services were uninterrupted.

When the strike was called off municipalities and tramway companies were of course anxious to restore their services as soon as possible and the employees were just as keen on getting back to work. Hence with the least possible delay agreements for re-engagements of men were entered into, differing, of course, somewhat in different places. The general scheme hitherto in operation as fixed by the National Industrial Joint Council for the tramway industry thus came to an end.

No meeting of this joint council was held to consider the new situation, however, until most of the local arrangements had been completed. When the meeting did take place the representatives of the employees admitted that in striking, the men had ignored the national council and had broken the national agreement. The employers' representatives announced that the council could continue in action if the employees' representatives would agree (1) that they would not give instructions to their members to strike without previous negotiations and without giving three months notice; (2) that they would give no support to their members who acted without authorization; (3) that they would not allow supervisory and clerical staffs to be members of their union; (4) that the reinstatement of employees should be left to each local authority for settlement; (5) that neither the employers' representatives nor the employees' representatives on the council should be subject to any interference by any other organization.

After much discussion the employees' side would not agree to item 3 and there was also a difference of opinion on item 4. The meeting broke up with a declaration from the employers that for the present the council had ceased to function.

A report submitted to a meeting of the London County Council on May 18 revealed the exact terms of settlement with the Council's tramway employees. As this is the largest tramway undertaking in the country, a summary of terms is of interest. They include the re-employment of all men, but not necessarily reinstatement in their former positions; the men to be re-engaged as soon as circumstances permit; an understanding that the volunteers remaining in the service will not be interfered with; no general alteration in wages and conditions of service; the Council not to undertake to re-engage men convicted of creating disturbances, but each case to be considered on its merits by the general manager. The Council decided to grant three additional days holiday with pay to each member of the staff who remained at the disposal of the Council during the emergency.

Lord Ashfield, chairman of the companies and of the London General Omnibus Company, has since addressed a letter to all volunteers who helped the companies, thanking them for their able and diligent service. The companies also thanked the general public for the good will and encouragement which it extended to the 10,000 men and women who were engaged in re-establishing the London transport services. During the emergency the trains, buses and tramcars in the group ran 750,000 miles and carried more than 4,000,000 passengers.

Australian Roads Face Serious Problems

Absorption of Private Buses by Municipal Tramways Debated—Forty-four-Hour Week Legalized

Transit conditions in the larger Australian cities are unsettled. The difficulties which the electric railways face are much the same as those which have prevailed in the United States in recent years. Bus competition and hours of labor loom as big problems at the present time.

A brief historical sketch of the situation is necessary for full understanding. Electric service was first established in New South Wales in Sydney in 1899. Until 1914 the tramway traffic steadily increased. Since that time, however, no funds have been allotted for extension of lines. In May, 1924, there were in this state 251 miles of track, over which 1,417 cars were operated. Because no money was available for extensions, it was proposed some time ago that bus service be started. So far nothing has been done by the municipality along these lines. More than 200 private buses now compete with the rail service and have caused heavy loss to the tramways. A law recently was passed to limit work to 44 hours a week and a reduction of fares is now being discussed. Thus it appears that some definite action must be taken in the near future to put the transportation service on a more stable basis.

Sydney has a difficult traffic problem, particularly during two weeks at Easter time each year, with an agricultural fair and races, and during the Christmas and New Year holidays. Intermittently there are other rush seasons as when the Royal British Naval Squadron or the American fleet is in port. During these periods provision must be made for special power supply, an increase in traffic men, superintendents, etc. A particularly difficult problem has arisen lately in connection with the Speedway, which accommodates about 50,000 people and which is inadequately provided with transportation facilities.

Brisbane, the capital of Queensland, has a zone system of fare collection, each section averaging 1 mile in length and the fare 1d. The system originally was operated by an American company, but was later taken over by the government, and about the middle of last December control passed to the Greater Brisbane Municipal scheme. A 44-hour week has been in effect in Brisbane for some time past and the tramways are now seeking increased fares. From the failure of this system to operate successfully with a 44-hour week and 1d. fares, it may be presumed that a similar scheme would be unsuccessful in Sydney.

In Melbourne, in the state of Victoria, the transit problem has been somewhat relieved by the extension of electric lines, including the electrification of a number of suburban steam railways. On Feb. 1, 1925, the motor omnibus act came into effect there, putting the control and regulation of bus traffic under the supervision of a committee appointed by the government. This committee consists of a chairman and four other members including representatives of the municipalities, the railways department and private motor bus owners. The board applied for permission to operate buses on five routes, but only one was granted, the Minister being of the opinion that the other routes should be reserved for private operators. Prior to this, in January, 1925, bus service had been started by the municipality on one suburban route. A short time ago, at the request of the Minister of Public Works, the loading of the buses was limited to the seating accommodations and measures were taken to prevent overcrowding at rush hours. This reduced the earnings, and the revenue fell to about 15d. (30 cents) per bus-mile. Considerable opposition has developed to the plan of municipal bus operation. This appears, however, to be based largely on a misconception concerning the place of the bus in the transportation field.

Added to this is a somewhat disconcerting bill recently passed establishing a 44-hour week to be worked as far as possible on five days. This, of course, cannot be applied to the transportation services, but all other industries will be obliged to conform. The 44-hour week is made compulsory, and there are severe penalties in the shape of overtime rates. In the transportation department alone at least 300 additional men will be needed by the tramways. The effect of the five days operation is expected to decrease the passenger revenue seriously because department stores and factories formerly were open for half a day on Saturday. All this travel will be lost and the only traffic available will be the pleasure seekers during the week end. The additional expenses to the tramways are estimated at £180,000 a year without any compensating revenue.

Recent Bus Developments

California Registration Act Unconstitutional

The California motor vehicle registration law was held unconstitutional by the Supreme Court of the United States as it was applied to the Frost & Frost Trucking Company by the Supreme Court of California. The trucking company was a private carrier operating over California highways. It was forbidden by state authority to continue operations unless it obtained a certificate of public convenience and necessity and became a common carrier subject to the regulation imposed on that class of carriers. The Supreme Court of California held that the state had the power to require as a condition precedent to operation over its highways that private carriers obtain certificates as common carriers.

Justice Sutherland, delivering the opinion of the court, said it was not controverted that a private carrier could not be converted against his will into a common carrier by mere legislative command. As applied by the California court, Justice Sutherland held, the law violated the rights of the trucking company as guaranteed by the process clause of the fourteenth amendment, and "that the privilege of using the public highways of California in the performance of their contract is not and cannot be affected by the unconstitutional condition imposed."

The significance of this decision as applied to New York State is that a new transportation corporation law was enacted by the last legislature which declares that a corporation organized to establish, maintain and operate for the public use any stage, omnibus or motor vehicle route or routes for the conveyance wholly within or partly without this state of persons or property is a common carrier as defined in the public service commission law.

Stage Line Between Logan and Utah-Idaho State Line

The Utah-Idaho Central Railroad, which operates an interurban line between Ogden, Utah, and Preston, Idaho, has been granted a certificate of convenience and necessity by the Public Utilities Commission of Utah to operate an automobile stage line for the transportation of passengers and express between Logan, Utah, and the Utah-Idaho state line and intermediate points.

In its application for a permit the Utah-Idaho Central Railroad pointed out that it had invested more than $5,500,000 in its railroad system, and during the winter months it would discontinue its bus service. The decision of the commission pointed out that the commission, whenever practicable, favors co-ordination between railroad service and automobile bus service over the public highways, with respect to both passenger and express.

The application of Gust Chopp for a permit to operate an auto stage line between the same points was denied on the ground that this applicant had not complied with the laws of the state, due to his failure to pay the tax on the line which he has been operating between Pocatello, Idaho, and Logan.

Electric and Steam Roads Aligned in Massachusetts Case

There is a "key" case before the Massachusetts Department of Public Utilities, affording the commission an opportunity judicially to define to what extent buses may be permitted to compete with street railways and railroads.

This case is based on the petition of the Service Bus Line, Inc., for a certificate of public convenience and necessity to operate its bus lines from Orient Heights in Boston, through the Point of Pines and out to Revere Beach. This line started three years ago, under a license from the City Council of Boston, and its license was made self-perpetuating so that it could not be revoked except for cause. It did not have to come up for renewal, like other licenses. The new bus law says it shall be *prima facie* evidence of public convenience and necessity if a line had been running a year when the new law became operative. The Service Bus Line, Inc., it appears, qualified under this provision.

Now it is attacked by the Boston, Revere Beach & Lynn Railroad, which is a narrow gage railroad from Boston to Revere. The bus line and the railroad parallel each other. Karl Adams, president of the Boston, Revere Beach & Lynn, addressing the Public Utilities Department on the situation, declared that the Boston city government "slipped it over" on the railroads when it issued this license three years ago, because no public hearings were held and the railroad and street railways never had an opportunity to oppose the operation of the line. As the license was self-perpetuating there has been no opportunity since the original issue to oppose the line and as it was in operation a year before the new law the bus company has the *prima facie* evidence in its behalf. Moreover, Mr. Adams questions the legality of a corporation operating under a license issued to an individual, and he declares that in the case of the Service Bus Line, Inc., the original license was issued to an individual before there was a corporation. That point is to be investigated.

Fred A. Cummings, vice-president of the Eastern Massachusetts Street Railway, says that he subscribes to the statements of President Adams and adopts them as applicable to his own road. He says that the competition of the bus line is savage, unjust, unwarranted; that it is nothing but scalping.

The question before the Public Utilities Department is whether the license held by the Service Bus Line, Inc., should be made permanent. In view of the points at issue the court ruling may become the "key" for a basic decision.

Bus Permits Stir Ire of Holyoke Company

The Holyoke Street Railway, Holyoke, Mass., which has been in touch with the Boston & Maine Railroad relative to operating the electric line between Mount Tom Junction and Easthampton, Mass., has announced that the recent granting of bus permits to the railroad to operate buses between Mount Tom Junction and Easthampton practically puts an end to the other plan. The latter idea also included the operation of the Williamsburg and Northampton line electrically. It was reported some time ago that the hitch in the negotiations had grown to such proportions that the Boston & Maine was losing interest. It is probable the new method of transportation will also mean that the East Street trolley line between the junction and Easthampton will have to be abandoned. The line at present is said to be a losing proposition.

The matter is to be placed before the Selectmen of Easthampton to decide whether they wish the trolley or bus. The bus move is considered to mean that the railroad is planning to take steps eventually leading to the establishing of Northampton as its bus terminal. The Holyoke Chamber of Commerce desires the railroad to make Holyoke the terminal.

No Legislation on Interstate Buses

Both the Senate and House committees on interstate commerce have agreed to pigeonhole until the next session, and perhaps until the next Congress, the bill to bring interstate bus and truck traffic under the jurisdiction of the Interstate Commerce Commission.

The Senate committee concluded the time was not ripe for such legislation and that it should not be hastily passed. Extensive hearings were held on the bill and though it had the backing of state commissioners and the bus division of the American Automobile Association considerable opposition developed. Much of this opposition was predicated on the belief that the bill would stifle competition. Several suggestions were offered, but the committee has given little consideration to them.

Commission Over-rules City's Bus Ordinance

An attempt to interfere with the state regulation of public utilities by the city of Zion, Ill., when it issued an order on March 29 prohibiting buses of the Chicago, North Shore & Milwaukee Railroad from stopping for passengers within its corporate limits on Sundays, was recently over-ruled by the Illinois Commerce Commission. That body decided that the charter granted to the utility by the state denies the right of a municipality to pass ordinances or take other measures to alter features of service as set forth therein. In response to the protests of more than 400 inconvenienced Zionites, the North Shore line appealed to the commission on May 18 for authority to renew the Sunday service. It was then that the commission issued its over-ruling order. Accordingly, an attempt was made by

the company to restore bus service on the original schedule. The driver of the first bus to stop within the city limits was arrested, however. Pending a promised action against the company by city officials, Sunday service in Zion has again been suspended.

Lines to Beaches Opened.—The New York State Railways, Rochester, N. Y., opened its bus lines on May 31 to Manitou and Grand View Beaches, cottagers' colonies on the shore of Lake Ontario near the city. The lines will remain in operation until the fall.

Competition Between Railway and Independent. — Competition with the Schenectady Railway, Schenectady, N. Y., is threatened by an ordinance passed by the Albany Common Council authorizing William G. Shultz to enter the city of Albany and to operate motor vehicles for hire over certain highways and streets for the purpose of carrying passengers and baggage between the city of Albany and the city of Schenectady. Mr. Shultz is restricted from carrying local passengers within the city of Albany.

Passage of Bus Ordinance Finally Recommended.—The city utilities committee of Seattle, Wash., has finally recommended the passage of an ordinance directing the Board of Public Works to call for bids on the purchase of fourteen new buses. The only string the committee tied to the recommendation is that the bodies be built in Seattle. An appropriation of $80,000 is available for the purchase of the buses, which will be used to augment present motor transportation lines operated by the city and to replace lines in the North End now privately operated.

Buses for Tourists' Season.—The Department of Street Railways, Detroit, Mich., through H. U. Wallace, general manager, has announced plans for extended bus service in the city during the coming tourists' season to run between the Michigan Central station and the business district. The schedule provides for coaches leaving the station and downtown every fifteen minutes between 9 a.m. and 4 p.m. and the fare will be 10 cents. The station street cars will continue to operate over their present routes. The service was requested by the Retail Merchants' Association, Detroit Hotel Association and Detroit Convention and Tourists' Bureau.

Richmond Bus Franchise Up for Consideration.—The streets committee of the City Council of Richmond, Va., is scheduled to meet June 16 to consider the proposed bus franchise. The bus situation has been considered from many angles. Phases of that unit of the transportation service cropped out during the prolonged consideration of the blanket traction franchise of the Virginia Electric & Power Company. Members of the committee believe that little time may be consumed in disposing of this auxiliary franchise. It will mean, they say, that the proponent parts will be discussed and that the public will be invited to appear before the committee at the proper time to enter protest or consent to the proposed routes. The Virginia Electric & Power Company will be represented at the meetings.

Financial and Corporate

Reorganization Plan Approved

Protective Committee of Fort Wayne, Van Wert & Lima Bondholders to Organize New Company

A plan of reorganization dated June 1 has been approved and adopted by the protective committee for the holders of first mortgage 5 per cent 25-year gold bonds of the Fort Wayne, Van Wert & Lima Traction Company, Fort Wayne, Ind. The bonds were due April 1, 1925.

Holders of such bonds not now deposited under the protective agreement may become parties to and participate in the benefits of the plan by depositing their bonds with all coupons due Jan. 1, 1920, and thereafter attached on or before June 23.

The property is covered by a mortgage dated April 1, 1905, of which $1,470,000 is now outstanding. All but $62,000 of said bonds are now deposited with the committee. The property has been in the possession of Henry C. Paul, receiver, since Feb. 1, 1921, appointed by the United States District Court for the District of Indiana and by the United States District Court for the Northern District of Ohio. As soon as in the judgment of the committee a sufficient number of bondholders have assented to this plan, the committee proposes to request the trustee to apply to the court for the entry of a decree foreclosing the mortgage and directing a sale of the property. The committee will bid for all or any part of the properties to be sold, whichever it deems advisable.

The committee proposes to organize a new corporation which will acquire all or such part as the committee may determine of the property which may have been purchased at the foreclosure sale, giving and paying therefore to the committee $441,000 of its general mortgage bonds and all its common stock. The new company will also assume all liability incurred by the committee and will reimburse the committee for all advances, expenses or disbursements. Capitalization of the new company will consist of $100,000 first mortgage bonds, $441,000 general mortgage bonds and 10,290 shares of common stock with or without par value. First mortgage bonds will be secured by a first mortgage upon all its properties including after-acquired property, will mature fifteen years from date thereof, will bear interest of 6 per cent and will be redeemable at such prices as approved by the committee and will contain other provisions including a sinking fund.

General mortgage bonds will be secured by a mortgage upon all properties, including after-acquired property, subject only to the $100,000 of bonds secured by the first mortgage. General mortgage bonds will mature thirty years from the date thereof, will bear interest of 5 per cent, payable semi-annually, and will be redeemable upon any interest date at $105.

Upon consummation of the plan and acquisition by the new company of the properties, and the issue by the new company of the stock and general mortgage bonds, the stock will be placed under a voting trust for a term of five years. The voting trust certificates and general mortgage bonds will be distributed by the committee to depositors as follows: Each holder of a certificate of deposit for $1,000 first mortgage bond of the present company will receive $300 of general mortgage bonds of the new company and voting trust certificates representative of seven shares of common stock of the new company.

Surplus of $11,241 in Quebec

After deducting operating expenses, bond interest and other fixed charges and depreciation a surplus of $11,240 was realized by the Quebec Railway, Light, Heat & Power Company, Quebec, Canada, for the year ended Dec. 31, 1925. This fact was disclosed in the sixteenth annual report of the company.

STATEMENT OF EARNINGS OF THE QUEBEC RAILWAY, LIGHT, HEAT & POWER COMPANY, LTD.

	1925	1924
Gross income from all sources	$3,243,123	$3,133,806
Operating expenses	2,194,987	2,156,492
Net operating income	$1,048,135	$977,314
Fixed charges	*816,895	712,642
	$231,240	$264,671
Depreciation reserve	220,000	250,000
Surplus (subject to deduction for income tax)	$11,240	$14,671

* This figure includes $44,664, percentage of city division earnings payable to the city of Quebec; $756,362, interest on bonds, and $15,867, interest general.

In his statement to the stockholders Julian C. Smith, president of the company, explains that during the year $518,000 of the company's 7 per cent general mortgage bonds were sold and the proceeds applied to the necessary construction and betterments. In accordance with plans prepared in 1923, additional extraordinary repairs and improvements to the property in general were made and further betterments to the system are contemplated. In addition, the building of new workshops is under consideration. As the present shops are small, old and inefficient, it is felt that by putting this project into execution economies and better operation will result. Mr. Smith said the directors were pleased to report the renewal of the street railway franchise for a period of 30 years. Substantial adjustments of the capitalization of the company, under consideration at the time of the last annual meeting, were made. The capital stock was reduced from $10,000,000 to $2,500.000 and the assets were correspondingly adjusted. The accompanying statement shows the results of operation in 1925 compared with 1924.

Interstate Public Service Reports Improvement in 1925

The Interstate Public Service Company, Indianapolis, Ind., has acquired by purchase all of the competing bus lines operating in the territory served, which has placed it in exclusive control of the interurban and bus transportation facilities between Indianapolis and Louisville. Forty-one buses are in regular daily operation. This statement was contained in the annual report of the Interstate Public Service Company for the year ended Dec. 31, 1925. The balance carried to surplus was $310,723. In his statement to the stockholders Harry Reid, president of the company, stated that the annual report reflected most gratifying growth and improvement over the preceding year. The gross operating income exceeded that of 1924 by $2,116,415, and the net earnings indicated an increase of $853,072.

INCOME ACCOUNT OF THE INTERSTATE PUBLIC SERVICE COMPANY FOR THE YEAR ENDED DEC. 31, 1925

Operating revenues		$8,916,453
Operating expenses (including retirement reserve, $248,466)		5,640,094
		$3,276,359
Uncollectible bills	$27,699	
Taxes	546,255	573,955
Operating income		$2,702,404
Rent for leased lines		171,296
Net operating income		$2,531,107
Non-operating income		38,502
Gross income		$2,569,609
Deductions from gross income:		
Interest on funded debt	$1,264,582	
Miscellaneous interest deductions	54,433	
Amortization of debt discount and expense	95,816	
Dividends paid on preferred stock of Indiana Power Company to date of purchase of property	36,933	1,451,765
Net income for the year		$1,117,844
SURPLUS ACCOUNT		
Surplus, Jan. 1, 1925		$803,544
Net income for the year, as above		1,117,844
		$1,921,388
Dividends paid and accrued:		
Prior lien stock	$584,935	
Preferred stock	222,185	
Common stock	385,416	1,192,537
		$728,850
Miscellaneous credits and debits (net)		61,711
Surplus, Dec. 31, 1925		$790,562

Mr. Reid refers to the increasing utilization of the parlor-buffet cars on the company's Indianapolis-Louisville interurban railway and states that the sleeping car service nightly in both directions between Indianapolis and Louisville has proved very popular and is being well supported by the public. This service is an important factor in creating through passenger revenue between the terminals that would not otherwise be secured. Several leading trunk line steam railroads have joined with the company in establishing a joint interline tariff which makes the company a participating carrier on interchange freight movements, receiving its proportionals on all published rates. This arrangement will materially increase the company's freight revenue.

In addition to other activities of the company, Mr. Reid refers to the employees' circulating library which has been created and maintained in the general offices for the availability of employees, also to the good public relations department, the women's committee and the safety work which has been continued, resulting in a low ratio of accidents. The accompanying statement shows the income account of the Interstate Public Service for the year ended Dec. 31, 1925.

Higher Fare in Richmond Benefits Property

For the year ended Dec. 31 1925, earnings from the transportation department of the Virginia Electric & Power Company, Richmond, Va., were $4,821,493. This compares with $4,749,044 for the previous year. It is the amount received from the 72,120,802 revenue passengers carried on the railways in Richmond, Norfolk, Portsmouth, Petersburg and on the interurban line between Richmond and Petersburg. Included in the amount are earnings from bus operation in Norfolk by this company and in Richmond by the Richmond Rapid Transit Company, acquired on Sept. 11. Miscellaneous revenue from advertising in cars and buses, and from other minor sources, is also included. Increased interurban fares and a change from 6 to a 7-cent railway fare in the city of Richmond have had a beneficial effect on the earnings of the transportation department. This was part of the explanatory statement made in the report of the directors of the company for the year 1925.

The report states that the acquisition of the Richmond Rapid Transit Corporation eliminated bus competition in Richmond. The operating deficit that was assumed when it was taken over was rapidly being reduced at that time, and the results of operation have since then been satisfactory. A unified street railway and bus transportation system operated exclusively by the Virginia Electric & Power Company became effective in Norfolk early in 1926.

ANNUAL REPORT OF THE VIRGINIA ELECTRIC & POWER COMPANY FOR 1925

	1925	1924
Total earnings	$12,143,975	$11,539,195
Expenses:		
Operation	$4,627,441	$4,477,522
Maintenance	1,402,467	1,430,367
Taxes	981,627	897,669
Total operating expenses and taxes	$7,011,536	$6,805,559
Net earnings:	$5,132,439	$4,733,636
Interest, amortization charge and lease rentals	1,512,202	1,427,307
	$3,620,237	$3,306,328
Dividends on preferred stock	718,878	581,543
Dividends on common stock	717,018	.....
	$2,184,340	$2,724,784
Special credit to surplus	2,798,191	.....
	$4,982,532	$2,724,784
Net direct charges to reserves and surplus	$129,688	$322,487
Retirement reserve	1,756,633	1,659,413
Sinking fund charges	322,184	304,080
Total deductions	$2,208,506	$2,285,980
	$2,774,025	$438,804
Deficit, Richmond Rapid Transit Corporation	87,517	.....
Balance to surplus	$2,686,508	$438,804
Ratio operating expenses to gross earnings, per cent	50.5	51.8

Financial Progress in Terre Haute Merger Awaited

Further steps in the proposed merger of the Terre Haute, Indianapolis & Eastern Traction Company, Terre Haute, Ind., and its subsidiaries with the Central Indiana Power Company, an Insull holding company, are expected shortly. On June 5 letters had been received from the holders of the 5 per cent cumulative preferred stock of the Terre Haute, Indianapolis & Eastern from a committee representing the stockholders suggesting that the stock be exchanged share for share for preferred stock of the merged company, which is to be known as the Indiana Electric Corporation. The basis of the merger agreement was entered into several months ago by Samuel Insull and the late Randall Morgan, who was one of the chief stockholders of the Terre Haute, Indianapolis & Eastern. Although no announcement was made, it is understood the merger plans were delayed by the death of Mr. Morgan shortly after the agreement was made.

The committee proposes to the holders of the 5 per cent cumulative preferred stock of the Terre Haute, Indianapolis & Eastern to exchange the stock par for par for shares of the Indiana Electric Corporation participating adjustment preferred stock of a par value of $100 a share.

The new stock is to receive from the company's surplus and net earnings non-cumulative preferred dividends for 1927 and 1928 of 2 per cent per annum; 1929 and 1930, 3 per cent per annum; 1931 and 1932, 4 per cent per annum; 1933 and 1934, 5 per cent per annum, and 1935 and thereafter, 6 per cent per annum. In addition it is proposed that this stock shall be entitled in 1925 and thereafter to an extra dividend of 1 per cent before more than a total of $600,600 shall be paid in total dividends to the common stock in any year.

Cincinnati Street Railway Will Purchase Milford Line

Purchase of the Cincinnati, Milford & Blanchester Traction Company by the Cincinnati Street Railway, Cincinnati, Ohio, has been approved by Edgar Dow Gilman, Director of Public Utilities, Cincinnati. The purchase price is approximately $49,000. Walter A. Draper, president of the Cincinnati Street Railway, said that operation of the line would undoubtedly begin within 30 days, that there would be improvement in equipment and service and operation of through cars from Mariemont to the heart of the city. The rate of fare will be fixed at 15 cents from Mariemont to the city.

While the Cincinnati, Milford & Blanchester Traction Company has made application to the Ohio State Public Utilities Commission to abandon that portion of the line from Milford to Blanchester, it is likely that the street railway will continue the operation of the system from Milford to Cincinnati, operating cars on a half hour schedule from Mariemont to Milford.

The Cincinnati, Milford & Blanches-

ter Traction Company, which is a standard gage railroad, is owned by a Toledo syndicate, headed by L. G. Van Ness, president of the Cincinnati, Georgetown & Portsmouth Street Railroad. The sellers will retain the power plant and go into the business of supplying towns along the route with electricity.

Revenue Lower on San Francisco-Sacramento Line

The operating revenue of the San Francisco-Sacramento Railroad, San Francisco, Cal., for the year ended Dec. 31, 1925, was $975,388, a decrease of $15,162 over the preceding year. Operating expenses were $868,966, an increase of $25,314 over the preceding year. The company had $57,194 available as net income for the twelve months' operation with which to pay bond interest and other deductions. Of this net income the company paid $50,489 for bond interest and $6,521 in interest on unfunded debt and miscellaneous deductions, leaving $183 transferred to surplus. These figures were contained in the sixth annual report of the company to the stockholders.

Because of the increased automobile competition the passenger earnings of the railroad have been steadily declining, and as the company sees it, the railway must, if it is to increase its earnings, increase its freight revenue. Owing to the stringency of the terms of the present deed of trust, it has been impossible to finance the necessary freight feeders. To meet this condition the company arranged with the Western Pacific and the Sacramento Northern, the latter company a subsidiary of the Western Pacific, to have the Sacramento Northern build a branch line of some 13 miles into the Holland Land District. The value of the Western Pacific and Sacramento Northern contract lies in the fact that it provides for the building of a valuable freight feeder immediately and in the future possibilities accruing from the trackage agreement. The accompanying table shows earnings and expenses for the year ended Dec. 31, 1925.

COMPARATIVE STATEMENT OF EARNINGS OF THE SAN FRANCISCO-SACRAMENTO RAILROAD FOR YEAR 1925

Revenue from transportation:	
Passenger	$657,851
Baggage	550
Parlor and chair car	9,894
Special car	25
Mail	1,500
Express	21,962
Milk	1,666
Freight	264,214
Miscellaneous	269
Total	$957,935
Revenue from other railway operation:	
Station and car privileges	$4,611
Parcel room receipts	511
Storage	341
Demurrage	1,978
Rent of equipment	5,983
Rent of buildings and other property	3,087
Miscellaneous	938
Total	$17,451
Total railway operating revenue	$975,387
Operating expenses:	
Way and structures	$228,690
Equipment	98,979
Power	105,890
Conducting transportation	249,427
Traffic	52,823
General and miscellaneous	141,560
Transportation for investment credit	8,405
Total railway operating expenses	$868,966
Net operating revenue	$106,421
Taxes assigned to railway operation	$52,376
Operating income	$54,045
Non-operating income	$3,148
Gross income	$57,193
Deductions from gross income:	
Interest on funded debt	$50,489
Interest on unfunded debt	3,581
Miscellaneous debits	2,939
Total deductions from gross income	$57,010
Surplus	$183

Reorganization Proposed for Illinois Interurban

Holders of the first mortgage 5 per cent gold bonds of the Rockford, Beloit & Janesville Railroad, Rockford, Ill., were notified recently that under a projected plan of reorganization they will be enabled to exchange their bonds for preferred stock of the company, which will be issued as soon as necessary legal steps are taken to foreclose the mortgage securing the bonds. The foreclosure proceeding follows an announcement that the receiver of the Rockford & Interurban Railway had agreed to surrender the property of the Rockford, Beloit & Janesville, which was a subsidiary of the former line, on the ground that it is now being operated at a loss and will endanger the security of bondholders of the Rockford & Interurban, if continued in operation by the receiver. A committee has arranged that the bondholders may exchange their bonds at a rate of three shares of new cumulative preferred stock, par value $50, and one share of no par common stock out of a total issue of 7,000 shares of such stock for each $1,000 in principal amount of bonds surrendered.

It has since been announced that T. Milton Ellis, president of the Beloit Traction Company, Beloit, Wis., has arranged to take over the Rockford, Beloit & Janesville Railroad and operate the line for the bondholders until given legal title to the line by the court.

Cessation of Service Sanctioned.—Discontinuance of trolley service by the Burlington County Traction Company between Burlington and Moorestown, N. J., was approved on May 27 by the New Jersey Board of Public Utility Commissioners. In another decision the board sanctioned the transfer to the Public Service Transportation Company of permits held by the Burlington County Transit Company for the operation of buses over the same route.

Surplus for Ten Months.—For the ten months ended April 30, 1926, the total revenue of the Interborough Rapid Transit Company, New York, N. Y., from all sources was $51,405,431, an increase of $2,451,949 over the corresponding period of last year. This increase is partly accounted for by the receipt in July, 1925, of a cash payment of $770,000 as part consideration for the new advertising contract, which became effective on Nov. 1, 1925. There was no similar payment in the previous year. Operating expenses, taxes and rentals paid to the city for the old subway increased $187,496. Income deductions increased $381,137. The net result for the ten months was a surplus of $1,849,467. This represents an improvement of $1,883,315, compared with the corresponding period of 1925, due largely to the new advertising contract.

Recommends That Claims Be Allowed.—Unsecured claims against the United Railways, St. Louis, Mo., reported to United States District Judge Faris by Special Master Fred L. Williams amount to $448,000. He recommended to the court that these claims be allowed. Most are damage suit judgments obtained prior to the receivership. Approximately $400,000 of the claims have been assigned to Stanley Clarke, attorney for the reorganization committee, having been settled by the committee.

$11,299 Available for Surplus.—The Santa Barbara & Suburban Railway, operating in Santa Barbara, reports to the California Railroad Commission its 1925 operating revenue at $123,531, compared with $137,053 for 1924. The operating expenses, excluding taxes, for 1925 are reported at $102,989 and at $103,755 for 1924, leaving net operating revenue of $20,542 for 1925 and $33,298 for 1924. During 1925 taxes charged to operation amounted to $9,242 and for 1924 to $10,769. Deducting the taxes leaves operating income of $11,299 for 1925 and $22,528 for 1924.

Bonds Not Paid.—The $300,000 of first mortgage 5 per cent bonds of the Shawnee-Tecumseh Traction Company, Shawnee, Okla., due June 1, were not paid off on that date nor has any provision been made for their extension. These bonds are all owned by the small syndicate which built the road and still owns the stock. It is said there is no likelihood of foreclosure proceedings being instituted.

Directors Favor Burlington Purchase.—An offer has been received for the purchase of the Burlington Traction Company, Burlington, Vt., and is favored by the directors. The traction company owns the trolley system in Burlington and the Military Post Street Railway, which operates lines between Burlington and Essex Junction via Winooski. The name of the purchasing company is at present withheld. Letters to stockholders state the directors have voted to purchase the stock of the Burlington Traction Company at par. The purchaser will pay in cash or 7 per cent stock of the new company, or part cash and part stock, as each stockholder may choose.

Line in Connecticut May Discontinue.—Court action which may result in the abandoning of railway operation by the Hartford & Springfield Street Railway between those cities was set for June 11. On that day Judge Isaac Wolfe was to hear the application of the company for permission to end service after June 25. The road was sold April 27 under a foreclosure of its bonded mortgage for $860,000, but Francis R. Cooley, who bid in the road as an individual bidder, did not take possession.

Book Reviews

Report of the Third Annual Convention of the Internationaler Strassenbahn- und Kleinbahnverein

Published by the association. 332 pages.

This is a report of the meeting held in Budapest June 21-25, 1925. In addition to the proceedings, there are several articles on electric railway developments in Budapest, a list of the attendants at the convention and a list of the members of the association. A table of the membership shows there are now 324 railway members and 101 manufacturer members, making a total of 425. This is an increase of 35 over the previous year. Abstracts of a number of papers presented at this meeting were published in the ELECTRIC RAILWAY JOURNAL during the latter part of last year.

Railway Engineering and Maintenance Cyclopedia

Simmons-Boardman Publishing Company, New York. 1,072 pages. 2,500 illustrations. Price, leather, $10; cloth, $8.

This is one of the comprehensive railroad encyclopedias issued by the publishers, companion books being the Car Builders' Cyclopedia and the Locomotive Cyclopedia. The volume just issued is a second edition of the Maintenance of Way Cyclopedia, which was published in 1921, but it has been changed in name to indicate its scope more accurately. It now includes a definitions section of 71 pages, a track section of 278 pages, a bridge section of 141 pages, a building section of 141 pages, a water service section of 84 pages, a signal section of 187 pages and a general section of 82 pages. The information in these sections has been compiled and edited in co-operation with the American Railway Engineering Association and the signal section of the American Railway Association.

The volume is an important contribution to the literature of railroad engineering and represents an amount of painstaking work which can hardly be realized by any one who has not engaged in a somewhat similar undertaking. The typographical appearance of the book is also good, the sizes of the type and illustrations being well chosen. Elmer T. Howson, Western editor of *Railway Age* and editor of *Railway Engineering and Maintenance*, had general charge of the publication of this cyclopedia.

Handbook of Automotive Standards

Issued by the Society of Automotive Engineers, 29 West 39th Street, New York, N. Y. 600 pages. Price $2.50 to members; $5 to non-members.

For the first time, all of the standards of this huge industry have been published in a bound handbook, of pocket size, 7½x4½ in. and only ¾ in. thick. The book contains all of the 500 odd standards and recommended practices approved by the society and revised to date. These include many drawings, tables, charts and forms and much elucidating text.

The contents are divided into sections relating to power plant, lighting, electrical equipment, parts and fittings, iron and steel, non-ferrous metals, nonmetallic minerals, transmission, axles and wheels, tires and rims, frames and springs, controls, bodies, tests, nomenclature, general, and standards committee regulations.

Hereafter revised editions are to be issued semi-annually, as the society approves new or revised standards and recommended practices only twice a year.

Pegasus or Problems of Transportation

By Col. J. F. C. Fuller. E. P. Dutton & Company, New York, N. Y. 1926. 88 pages. $1.

A story of future movement is told by a British war veteran, Col. J. F. C. Fuller, in "Pegasus or Problems of Transportation." His accounts of the "Battle of the Iron Horse," fought by George Stephenson, the father of the locomotive, and his suggestions for "The Conquest of the Elysian Fields" are so sympathetic and realistic that a reader is easily won over to the doctrine of the caterpillar or semi-caterpillar type of vehicle as a practical solution for many present transportation problems.

The accomplishment of the tank in France in the World War inspired Mr. Fuller with its potentialities in England in a time of peace, confronted with the difficulties of surplus population and unemployment. He sees three solutions to the problem—"we must stop breeding, we must create new home industries and so absorb our surplus population, or we must transport the surplus to less thickly populated areas overseas." Birth control he summarily dismisses, for the government does not believe in it. The second solution joins the first because of the existing subsidy for the coal mining industry and the subsequent lack of protection for new industries. As regards the third, he believes very little has been done outside of private effort. He says the problem has been tackled from the wrong end. Instead of persistent efforts to shift the unemployed, attempts should be made to shift the men already employed.

It is his belief that the empty spaces of the world will be settled only as transportation is quickened. The steamship and the railway must be used first and then the motor vehicle. He sees the roadless vehicle as most useful because it can go anywhere and take the man to his work and his products to market in less time than the motor truck rolling along a prescribed area.

The technicalities of the roadless vehicle are not discussed, but he mentions two main types: An all-tracked machine of the tank type and a half-tracked machine which has wheels in front and tracks in the rear. In the manufacture of these vehicles three main problems must be solved—the vehicle must be able to use roads without damaging them and it must not damage the surface of the ground over which it travels, it must be able to move across country without damaging itself, and the cost per ton-mile must be equal or lower than that of existing vehicles.

Although Colonel Fuller believes that the roadless vehicle can replace the motor car, he states it cannot replace the railway if the railway is an efficient one. But the problem, according to him, is, first, to bridge the gap between the producer and the railway, and, second, to create in undeveloped countries sufficient wealth to enable more railways to be built. Co-operation with existing railways must be the aim.

He compares his dream of the great future of the roadless vehicle to the prediction of Mr. Balfour, who on May 17, 1900, in the House of Commons said: "In addition to railways and tramways we might see great highways constructed for rapid motor traffic." But as Stephenson won the battle for the Iron Horse by imagination, perseverance and an indifference to the jibes of the ordinary mortals, so will the transport difficulties of today be solved when Pegasus with wings "conjures up images of things to be."

Safety Rules for the Installation and Maintenance of Electric Utilization Equipment

Prepared by the Bureau of Standards. Government Printing Office, Washington, D. C. 72 pages. 15 cents.

Handbooks Nos. 6 and 7 of the Bureau of Standards, safety rules for the installation and maintenance of electric supply stations and for electric utilization equipment are printed in small handbooks containing a single part of the code by the Department of Commerce, Bureau of Standards, George K. Burgess, director.

In response to a demand that the fourth edition of the National Electrical Safety Code be issued in separate publications dealing with the several subjects covered, the Department of Commerce, Bureau of Standards, has issued Nos. 6 and 7. No. 6 gives the safety rules for the installation and maintenance of electric supply stations and contains sections No. 9 to 18 inclusive of the National Electrical Safety Code. Handbook No. 7 gives the safety rules for the installation and maintenance of electric utilization equipment and contains sections 9 and 30 to 39 inclusive of the safety code.

The first editions of these rules is the result of a revision which was carried out according to the procedure of the American Engineering Standards Committee and the revised rules have had the approval of the sectional committee organized according to those rules of procedure. Two sizes of type have been used in the text of the handbook, the larger contains the rules proper, whereas the explanatory notes, etc., are in smaller type.

The Electrician—Annual Tables of Electricity Undertakings

Benn Brothers, Ltd., 8, Bouverie Street, London, E.C. 4. Price, 10/9.

This is the 39th edition of the Annual Tables of Electricity Undertakings, published annually since 1888. The tables have been thoroughly revised and further useful details have been added. Particulars of many additional undertakings in Great Britain, Europe and the colonies and countries overseas have been included, the total number now dealt with being more than 2,000.

Personal Items

W. R. Robertson New Canadian President

W. R. Robertson, since 1920 general superintendent of railways Hydro-Electric Power Commission of Ontario, was elected president of the Canadian Electric Railway Association at its 22d annual convention held in Quebec on June 2-4. Many years of experience in electric railroading have made Mr. Robertson an expert with statistics. Ask him any question pertaining to the subject and he will reach into his brief case and bring out the most convincing figures. This has become such a habit with him that a taxicab is needed to carry his well-filled cases.

Mr. Robertson became identified



W. R. Robertson

with the utility business at the age of twelve, when he started work for the Bell Telephone Company. After holding various positions in the steam railroad field, in the latter part of 1897 he accepted a position with the Port Dalhousie, St. Catharines & Thorold Railway, one of the first electric lines in Canada. The next year he left to enter the foundry business. The transportation urge was too strong, and in 1899 he went with the Niagara Central Railway just prior to its electrification. Promotion followed, and he advanced through the grades of inspector, assistant superintendent and transportation manager until he was made superintendent in 1903.

Meanwhile the company was expanding, and in 1909 Mr. Robertson was made general superintendent, the name having been changed to Niagara, St. Catharines & Toronto Railway & Navigation Company. He remained in that position until the road was taken over by the government as part of the Canadian National Railways. At present he is general superintendent of the entire system of Hydro-Electric Railways, which operates transportation services in Peterboro, Guelph and Windsor, and also the Toronto and York "radials," or interurbans, the whole comprising more than 200 miles. Mr. Robertson was born in Hamilton, Ont., on June 28, 1875.

Changes in Milwaukee Bus Personnel

Alvin McEvoy, who has been connected with the Wisconsin Motor Bus Lines of the Milwaukee Electric Railway & Light Company, Milwaukee, Wis., since their inception, has been promoted from supervisor of personnel to assistant superintendent of operation.

Andrew H. Johnson, who has been chief clerk for four years of the Wisconsin Motor Bus Lines, Kinnickinnic station, and prior to which he was associated with the electric railway division since 1913, has been promoted to inspector of service in the bus traffic department.

Norman Mangert, city line supervisor, has been selected to fill Mr. Johnston's post.

Eugene S. Gregg, for five years chief of the transportation division of the Department of Commerce, resigned recently to accept a position in the executive offices of the Western Electric Company, 195 Broadway, New York City. After graduation from Austin College and the University of Chicago, Mr. Gregg had extensive experience in transportation work as first lieutenant and captain, in the shipping section of the General Staff, U. S. A., War Industries Board, Shipping Board and later as chief of the shipping section of the American International Corporation. Mr. Gregg was appointed from Texas to the service of the Department of Commerce in August, 1921, as chief of the transportation division.

J. A. Federhen has recently become associated with the Fort Smith Light & Traction Company, Fort Smith, Ark., as assistant to Robert C. Coffy, in charge of public relation. Mr. Federhen is an example of an outsider who has made a success in other lines of endeavor and hopes to find in the public utility industry the opportunity to do bigger things. In June, 1913, he became associated with the Springfield Post Office, serving in all departments, including the civil service bureau. He was promoted to superintendent of mails in the Fort Smith, Ark., post office in August, 1922. The desire to enter a broader field led him into public utility work. Mr. Federhen was born in Milwaukee, Wis., and moved to Springfield, Ill., at an early age.

E. L. Fariss, general stores keeper for the Georgia Railway & Power Company, Atlanta, Ga., has resigned to join his brother in operating a Ford agency at Tampa, Fla. Mr. Fariss joined the Georgia Railway & Power Company in 1908 as a meter reader. Shortly afterward he was transferred to the stores department, and in 1925 he was made general stores keeper for the company.

H. E. Borton Heads Southwestern Public Service Association

As a tribute to his untiring efforts in promoting Southern enterprise and in recognition of his accomplishments in that section of the country Harold E. Borton was elected president of the Southwestern Public Service Association at the recent convention in Galveston, Tex.

Mr. Borton has had a long and varied experience with public utilities. His early history is interwoven with the activities of the Fred A. Jones Construction Company, engaged in building the Texas Traction Company and the Southern Traction Company, operating lines to Denison and Waco. These two roads are now included as part of the extensive interurban system of the Texas Electric Railway. This was one of the great developments in the utility field in the South, the company now owning 272 miles of line. Mr. Borton later turned his attention to



H. E. Borton

the Corsicana Gas & Electric Company, which he served as operating superintendent from 1911 to 1916. This served to round out his other engineering and management experience. Relinquishing his affiliations with this company, he assumed the general managership of the Calvert Water, Ice & Electric Light Company, and remained in this capacity for seven years. Then it was that he became associated with the Texas Power & Light Company and affiliated companies, among which he holds the office of vice-president of the Mineral Wells Electric Company.

Mr. Borton has a great capacity for work, for although he was at times practically overwhelmed with the immediate duties of the offices of the company with which he was identified he always kept up his association activity, giving more than his passive presence at the meetings. During two different terms he served as vice-president and chairman of the electric section.

Other officers of the Southwestern Public Service Association elected at the meeting in Galveston are E. H. Kifer, first vice-president and chairman of the electric section; W. H. Burke, second vice-president and chairman of the railway section, and C. K. Fletcher, third vice-president and chairman of the gas section.

Obituary

J. D. Spreckels

A railway magnate, sugar promoter, shipping owner, banker, capitalist and philanthropist died in Coronado on June 9. This man was John Diedrich Spreckels, a romantic figure of the West and a practical idealist of the twentieth century. His death marks another milestone in the tradition of the famous Spreckels family, all of whom were imbued with a spirit of adventure and pioneering and in the history of San Diego, which has become of late years synonymous with the name of Spreckels. At the time of his death Mr. Spreckels was president of the San Diego Electric Railway and the San Diego & Arizona Railway.

One of his early connections with the street railway business was the purchase, with his brother, Adolph B. Spreckels, who died a few years ago, of the San Francisco & San Mateo Electric Railway, which after reconstruction was sold to Eastern capitalists who acquired other lines in the city, and all were finally consolidated into the United Railroads of San Francisco. He first visited San Diego in 1887. To this accidental acquaintance with that city can be traced not only the development of one of the most progressive electric railway systems in the country but also the success of many large industrial enterprises. He and his brother bought the horse car line in 1890. They reconstructed and electrified it and began operation with twelve 24-passenger cars. Today the system operates 105 miles of line and owns 178 motor passenger cars. Not in terms of equipment or mileage is its good will measured, but rather in its never-ending campaign to satisfy its customers. In this phase of the work he was fortunate in having at the helm a son, Claus Spreckels, a man with a capacity for clear thinking and a willingness to do right by his superiors and subordinates, and with him as general manager of the property is shared the laurels for the successful management of this system. What Claus Speckels and Ed Burns, his assistant for a time, accomplished through human relations activities in San Diego is a matter of record.

Limning John D.'s railway career alone presents an unfinished picture. A son of a "sugar king," he too found a place for himself in the sugar trade, which had made his father, the late Claus Spreckels, a prominent figure on the West coast and on the Hawaiian Islands. He needed ships to advance his interests, so with characteristic temerity and tenacity he launched a commercial fleet which later was to plow its way to the Fiji Islands and Australia. His shipping interests grew into the present Oceanic Steamship Company.

In the midst of his busy career he found time to devote himself to many philanthropic projects and public service requirements.

John D. Spreckels was not a product of California soil. He was born in Charleston, S. C., 72 years ago. When a very young boy his parents moved to California. He was educated at the Polytechnic School at Hanover, Germany, and at Oakland College, Cal.

A. C. Baker, who retired recently as director in chief of the Sesqui-Centennial Exposition of Philadelphia, died on June 5. Upon mentioning his retirement in the ELECTRIC RAILWAY JOURNAL of May 29, page 951, it was stated that E. L. Austin, business manager and comptroller, would succeed Mr. Baker.

Samuel H. Dannatt, manager of the New York office of the Electric Service Supplies Company, died May 30 at his home in Mount Vernon, N. Y. Mr. Dannatt was associated with this company for five years. Prior to his connection with the Electric Service Supplies Company he was associated with the Westinghouse Electric & Manufacturing Company, the Electric Power Equipment Corporation and the Una Welding & Bonding Company.

Manufactures and the Markets

News of and for Manufacturers—Market and Trade Conditions
A Department Open to Railways and Manufacturers
for Discussion of Manufacturing and Sales Matters

Graham Brothers' Sales Gain

Total factory shipments of Graham Brothers' trucks and motor coaches from Jan. 1 to May 15, 1926, amounted to 13,022, a gain of 5,027, or 63 per cent over the corresponding period one year ago.

Shipments of Graham Brothers' trucks and motor coaches in several days less than four months of 1926 exceeded the entire factory production of 10,728 units shipped in the twelve months of 1924.

In 1922 factory sales showed a gain of 181 per cent over the previous year, while in 1923 the gain was 105 per cent over 1922. Sales for 1925 showed a gain of 123 per cent over 1924.

Gas-Electric Rail Cars

Delivery of two combination passenger and baggage gas-electric rail cars, one combination mail and baggage trailer, and one passenger and baggage trailer has been made to the Central Vermont Railroad by the J. G. Brill Company, Philadelphia, Pa. One combination passenger and baggage gas-

East Taunton Gets New Cars



Delivery has just been made to the East Taunton Street Railway, Taunton, Mass., of two double-truck light-weight one-man two-man cars by the Wason Manufacturing Company, Springfield, Mass. The seating capacity of these cars, which have an over-all length of 36 ft. 10 in., is 44. They are of semi-steel construction. Principal specifications follow:

Weight:	
Car body	12,934 lb.
Trucks	9,400 lb.
Equipment	5,600 lb.
Total	27,934 lb.
Bolster centers, length	17 ft. 8 in.
Length over all	36 ft. 10 in.
Truck wheelbase	5 ft. 6 in.
Width over all	8 ft. 1 in.
Height, rail to trolley base	10 ft. 11⅞ in.
Body	Semi-steel
Interior trim	Mahogany
Headlining	Agasote ¼ in.
Roof	Arch
Air brakes	General Electric
Armature bearings	Plain
Axles	4 in. diameter, 4½ in. gear seat
Bumpers	Channels, 6 in.
Car signal system	Faraday buzzer
Car trimmings	Statuary bronze
Center and side bearings	Brill
Compressors	CP-27B
Conduits and junction boxes	Standard
Control	K-35-JJ
Couplers	Bar
Curtain fixtures	Pinch handle
Curtain material	Fabrikoid double faced
Destination signs	Hunter illuminated
Door operating mechanism	Manual
Fenders	Lifeguards
Finish	Enamel
Gears and pinions	G. E. solid
Hand brakes	Peacock type G-14.34
Heater equipment	Gold 405-E. B.
Headlights	Golden Glow
Journal bearings	Friction
Journal boxes	Brill
Lightning arresters	G. E. MD.
Motors	Four G. E. 25-hp., inside hung
Sanders	Ohio Brass
Sash fixtures	J. L. Howard rack
Seats	Brill "Wayio"
Seating material	Rattan, spring upholstered
Springs	Brill
Step treads	Mason safety
Trolley catchers	Wilson type "T"
Trolley base	U. S. automatic
Trolley wheels	G. E.
Trucks	Brill 177-EX
Ventilators	Eight Brill exhaust type
Wheels	26 in. diameter

electric car is also being built for the East Broad Top Railroad & Coal Company.

Armco Culvert Industry Celebrates Anniversary

This year the thirtieth anniversary of the invention of the corrugated culvert is being celebrated by the Armco Culvert & Flume Manufacturers' Association, Middletown, Ohio. A feature of the celebration is the display in the association's research laboratory at Middletown of the first corrugated culvert ever made. This culvert was manufactured by the inventor, James H. Watson, and placed early in 1896 under a public highway near Crawfordsville, Ind., from which location it was recently removed for exhibition purposes. It is one of many similar culverts still in service near Crawfordsville.

Thirty years ago James H. Watson and his immediate successor, W. Q. O'Neall, conducted a small hand-operated factory at Crawfordsville and succeeded in getting a number of culverts placed, with many misgivings, under nearby roads. Today the Armco culvert industry operates more than 30 thoroughly modern and efficient plants.

Yellow Truck Earnings

Yellow Truck & Coach Manufacturing Company, Chicago, Ill., reports a net income of $2,330,743 in 1925, after depreciation, taxes and other charges. This compares with $2,742,408 for the Yellow Cab Manufacturing Company, the predecessor company, in 1924. Allowing for the year's dividends on the $15,000,000 7 per cent preferred stock, the balance would be equal to 91 cents a share of $10 par value earned on the combined 600,000 shares of class B stock, and 800,000 shares of common stock, comparing with $1.20 a share on the same basis in 1924.

World's Largest Office Building to Take Graybar Name

Announcement was made recently by Frank A. Ketcham, executive vice-president of the Graybar Electric Company, following signing by his company of a contract leasing the entire fifteenth floor of the proposed largest office building in the world, that the new structure will be known as the Graybar Building, taking its name from the Graybar Electric Company. The new building will be located adjacent to the Grand Central Terminal, facing Lexington Avenue and situated between 43d and 44th Streets. The building will occupy more than 1½ acres of ground and will be ready for occupancy May 1, 1927.

The Graybar Electric Company was incorporated Jan. 1 of this year as the successor to the supply department of the Western Electric Company.

Metal, Coal and Material Prices

Metals—New York	June 8, 1926
Copper, electrolytic, cents per lb	13.90
Copper wire, cents per lb	16.00
Lead, cents per lb	7.675
Zinc, cents per lb	7.40
Tin, Straits, cents per lb	58.75
Bituminous Coal f.o.b. Mines	
Smokeless mine run, f.o.b. vessel, Hampton Roads, gross tons	$4.50
Somerset mine run, Boston, net tons	1.925
Pittsburgh mine run, Pittsburgh, net tons	1.825
Franklin, Ill., screenings, Chicago, net tons	1.675
Central, Ill., screenings, Chicago, net tons	1.75
Kansas screenings, Kansas City, net tons	2.50
Materials	
Rubber-covered wire, N. Y., No. 14, per 1,000 ft	$6.25
Weatherproof wire base, N. Y., cents per lb	18.00
Cement, Chicago net prices, without bags	2.10
Linseed oil (5-bbl. lots), N. Y., cents per lb.	11.20
White lead in oil (100-lb. keg), N. Y., cents per lb	15.00
Turpentine (bbl. lots), N. Y., per gal	$0.88

Rolling Stock

Northern Ohio Traction & Light Company, Akron, Ohio, has just ordered a Differential car wheel truck and tractor from the Differential Steel Car Company, to be fitted to its Thew electric shovel.

Niagara, St. Catharines & Toronto Railway, St. Catharines, Ont., plans to turn out soon twelve new one-man cars made in their entirety in the St. Catharines shops of the Canadian National Railways. The cars are bright yellow in color, of steel construction and are in every way complete as to modern running gear and safety devices. The cars weigh 29,000 lb. and seat 44 passengers. They will be used on the city and local lines in St. Catharines and Niagara Falls.

Utah Light & Traction Company, Salt Lake City, Utah, is making a number of improvements in its one-man street cars. Installation of automatic rear exits will constitute one of the principal changes. A treadle on the back platform, which may be operated by passengers when they wish to leave the car at the rear door, is expected to facilitate loading and unloading in the rush hours. Larger carrying capacity will be provided in the remodeled cars by removing the side seats from the front to the back, thereby making a larger and more comfortable bench at the rear of the car. Better lighting and ventilating facilities have been provided and arrangements have been made to keep the cars more sanitary by improved sweeping and mopping conditions. New fenders and lifeguards have been added to the cars. The lifeguard is operated automatically and the least touch on the fender in front will cause the scoop under the car to drop. Two of the new type are completed.

Track and Line

Los Angeles Railway, Los Angeles, Cal., has started the extension of the Eighth Street line to Western Avenue.

Springfield Street Railway, Springfield, Mass., will start construction early in July on the relaying of trolley rails and paving the roadway on Main Street between Vernon Street and Sharon Street. The company will also lay a concrete base under both tracks on Fort Pleasant Avenue.

Pacific Northwest Traction Company, Everett, Wash., will receive bids until June 21 for the construction of a steel or wood overhead crossing 100 ft. long spanning the North Trunk Highway 5 miles north of Seattle. Bids will be received at the office in Everett.

Power Houses, Shops and Buildings

Nashville Railway & Light Company, Nashville, Tenn., has completed the new $45,000 railway substation on Wedgewood Avenue near the Tennessee Central Railway crossing. As the new station was completed, a 500-volt synchronous condenser was also placed in operation.

Mobile Light & Railroad Company, Mobile, Ala., will occupy its new $40,000 brick office building at its yards on Springhill Avenue by Sept. 1. The structure will be two stories high; all the second floor and part of the first will house the business offices. On the first floor will be shops for minor repair work. A. H. Downey is the architect of the structure.

Trade Notes

Robert June Engineering Management Organization, Detroit, Mich., has moved to larger quarters at 2208 West Graham Boulevard, where it now occupies the entire building. This is the organization's fourth move in four years to larger quarters. The new building will provide greater facilities for giving service to clients.

Industrial-Utilities Service Bureau, Louisville, Ky., A. R. McLean, principal, announces that to keep pace with Louisville, and the bureau's constantly increasing business, it has been found necessary to formulate a program of expansion. The first move in this direction will be larger quarters at Suite 303 and 304 the Lincoln Bank & Trust Company, Louisville. The bureau specializes in the handling of matters connected with personnel.

Johnson Fare Box Company, Chicago, Ill., announces that its New York offices and service station have been moved to 2 West 61st Street, near Columbus Circle. The new telephone number is Columbus 8859.

New Advertising Literature

Crouse-Hinds Company, Syracuse, N. Y., has issued a booklet, "Traffic Signal Systems." It is designated as bulletin No. 217 and deals not only with the traffic signals but with the necessary control apparatus which accompanies them. Signals for overhead suspension or for street mounting and of various colored light systems are listings.

Westinghouse Electric & Manufacturing Company has released special publication 1643-A describing the application of oil circuit breakers. It describes fully the general application of oil circuit breakers, the determination of short-circuit current and the precautions necessary, and devotes a number of pages to tables and charts. Several interesting halftone illustrations are also included. This publication may be obtained from any of the district offices of the Westinghouse company or from the department of publicity at East Pittsburgh, Pa.



Light-weight cars call for light-weight equipment—



The Peacock Staffless

Modernization in car design and operation leads to light-weight cars, which in turn require light-weight but rugged and dependable hand brakes.

Peacock Staffless Brakes more than meet these requirements.

They occupy minimum floor space. They have a demonstrated capacity for winding in 144 inches of chain—so that neither slack chain nor worn brake shoes can prevent effective braking. Their power is at least three times as great as any ordinary type of hand brake.

It is such qualifications that make Peacock Staffless Brake especially adapted for the modern, light-weight safety car, both single-and-double-truck.

Send for further information about Peacock Staffless Brakes

National Brake Co., Inc.

890 Ellicott Sq., Buffalo, N. Y.

Canadian Representative:
Lyman Tube & Supply Co., Limited, Montreal, Canada

PEACOCK
Staffless Brakes

Bankers and Engineers

Ford, Bacon & Davis
Incorporated
Engineers
115 Broadway, New York
PHILADELPHIA CHICAGO SAN FRANCISCO

The J. G. White Engineering Corporation
Engineers—Constructors
Oil Refineries and Pipe Lines, Steam and Water Power Plants, Transmission Systems, Hotels, Apartments, Office and Industrial Buildings, Railroads.
43 Exchange Place New York

STONE & WEBSTER
Incorporated
EXAMINATIONS REPORTS APPRAISALS
ON
INDUSTRIAL AND PUBLIC SERVICE PROPERTIES
New York Boston Chicago

THE BEELER ORGANIZATION
ENGINEERS AND CONSULTANTS
Traction - Traffic - Equipment - Power Investigations
TRANSPORTATION, TRAFFIC, AND OPERATING SURVEYS
COORDINATING SERVICE—FINANCIAL REPORTS
APPRAISALS—MANAGEMENT
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ENGINEERS
PUBLIC UTILITIES & INDUSTRIALS
Design Construction Management
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ENGELHARDT W. HOLST
Consulting Engineer
Appraisals Reports Rates Service Investigation
Studies on Financial and Physical Rehabilitation
Reorganization Operation Management
683 Atlantic Ave., BOSTON, MASS.

ALBERT S. RICHEY
ELECTRIC RAILWAY ENGINEER
WORCESTER, MASSACHUSETTS
REPORTS - APPRAISALS - RATES - OPERATION - SERVICE

KELKER, DeLEUW & CO.
CONSULTING ENGINEERS
REPORTS ON
Operating Problems Rates Traffic Surveys
111 W. Washington Street, Chicago, Ill.

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INCORPORATED
ENGINEERS AND CONSTRUCTORS
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ENGINEERING CONSTRUCTION — YOUNGSTOWN, O. — FINANCING MANAGEMENT

WALTER JACKSON
Consultant on Fares and Motor Buses
The Weekly and Sunday Pass—Differential Fares—Ride Selling
143 Crary Ave., Mt. Vernon, N. Y.

Transmission Line and Special Crossing Structures, Catenary Bridges
WRITE FOR OUR NEW DESCRIPTIVE CATALOG
ARCHBOLD-BRADY CO.
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Byllesby Engineering & Management Corporation
231 S. La Salle Street, Chicago
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Incorporated
ENGINEERING AND CONSTRUCTION
Examinations—Reports—Valuations
Transportation Problems—Power Developments
68 Trinity Place, New York
CHICAGO ST. LOUIS

JAMES E. ALLISON & CO.
Consulting Engineers
Specializing in Utility Rate Cases and Reports to Bankers and Investors
1017 Olive St., St. Louis, Mo.

THE P. EDWARD WISH SERVICE
50 Church St. NEW YORK — *Street Railway Inspection* DETECTIVES — 131 State St. BOSTON

When writing the advertiser for information or prices, a mention of the Electric Railway Journal would be appreciated.

NAUGLE POLES
WESTERN & NORTHERN CEDAR
NAUGLE POLE & TIE CO.
59 E. MADISON ST. CHICAGO ILL.
New York · Columbus · Kansas City · Spokane · Vancouver · Boston

"Axle Specialist Since 1866"
Address all Mail to Post Office Box 515, Richmond, Va.
CAR AXLES
J. R. JOHNSON AND CO., INC.
FORGED STEEL AXLES
For Locomotives, Passenger, Freight and Electric Cars
Smooth Forged or Rough Turned—Carbon or Alloy Steel—Plain or Heat Treated, Forged and Turned Piston Rods, Crank Pins, Large Shafts, Round Bars, etc.

ROEBLING
WELDING CABLE
ELECTRICAL WIRES and CABLES
John A. Roebling's Sons Company, Trenton, N. J.

A Single Segment or a Complete Commutator
is turned out with equal care in our shops. The orders we fill differ only in magnitude; small orders command out utmost care and skill just as do large orders. CAMERON quality applies to every coil or segment that we can make, as well as to every commutator we built. That's why so many electric railway men rely absolutely on our name.
Cameron Electrical Mfg. Co., Ansonia, Connecticut

BRAZED Rail Bonds ARC WELD
Portable Arc Welding Outfits
The Electric Railway Improvement Co.
Cleveland, Ohio

Northern CEDAR POLES Western
We guarantee
all grades of poles; also any butt-treating specifications
BELL LUMBER COMPANY
Minneapolis, Minn.

FOR SAFETY FROM FIRE
INSTALL THE
IMPROVED Pyrene EXTINGUISHER

Safety demands that every car or bus be equipped with Pyrene. The riding public expect and are entitled to the protection from fire which this extinguisher assures.

Aside from the protection from fire afforded by such installation, to both rolling stock, operator and passengers, the schedule of the Central Traction and Lighting Bureau specifies a charge of 5¢ on motor buses, 3¢ on interurban and 1¢ on urban cars, for the absence of fire extinguishers.



The slight outlay involved by having rolling stock equipped with an improved Pyrene one quart extinguisher should be regarded as an investment—a device that helps make safety from fire certain should be popular.

Safety adds to the revenue of the operating company by inspiring confidence in the riding public toward modern transportation.

Many of the leading Public Service Corporations recognize this and have equipped their cars and buses with Pyrene extinguishers — they know a burning car or bus need not be abandoned if PYRENE is at hand.

For the protection of electrical equipment, power houses, car barns, shops and storerooms PYRENE 1½ quart extinguishers are dependable in every emergency.

THE PYRENE MANUFACTURING CO.
NEWARK, N. J.

"Fortify for Fire Fighting"



Reo
Pay-Enter
Bus

REO conceived the Law of the Average Load applied to Bus Transportation—

Created the Bus priced in prudent ratio to the investment dollar—

Standardized the production, and

Popularized the type.

No Other Bus Combines these Features of the Reo Model "W"

Six-Cylinder Engine
Balanced Crankshaft
Sub-Frame
Standard Tread
163 Drop Forgings
Four-Wheel Brakes
Standardized Bodies
Service in Nearly 2,000 Cities
Low-priced Repair Parts
Accessibility of all Units

Reo Motor Car Company - Lansing, Michigan



Reo Pay-Enter Grand

CONVENTION WEEK

Jan. 1st to Dec. 31st



Five short days—October 4th to 8th—have been set aside for the A.E.R.A. Annual Convention and Exhibit in the Public Auditorium at Cleveland.

Since January 1st, however, the manufacturers that you will meet in Cleveland have been holding a *continuous* exhibit and convention in Bangor and San Diego, Chicago, and New Orleans and every other railway operating center.

The auditorium, in this case, is the magazine that you are reading and all other railway journals, together with the letters, catalogs and pamphlets you receive by mail.

You find, in these announcements, illustrations and descriptions of equipment, news of installations, operating data and much else that you will not have time to study during your five days in Cleveland. They form a permanent exhibit on your desk or in your files—a convention that is open to you at all hours daily from the first of January to the last day of December every year.

As you turn from page to page, passing from one advertisement to the next, you will, of course, observe that one page is more attractively presented and more interesting than another. These pages are sure to attract more readers just as some of your regular convention booths attract the largest crowds.

If you go behind the scenes, you will usually find that the most attractive booths have been designed by experts. So have the most attractive advertisements. It is just as important to be well represented in the all-year advertising convention as in any five-day or one-week exhibit. An ever-growing number of equipment manufacturers, therefore, are placing their advertising in our hands and an ever-growing number of railway operators are looking for our lighthouse trade-mark to identify the advertisements we have written.

Doyle, Kitchen & McCormick, Inc.
2 WEST 45th STREET, NEW YORK
An Advertising Agency



Goodyear Balloon Bus Tire
Made with Supertwist

GOODYEAR

Copyright 1926, by The Goodyear Tire & Rubber Co., Inc.

Goodyear Balloon Tires for Motorbuses

These nine successful and well-known operators are among the bus owners now using Goodyear Balloon Tires.

Their common experience is that these tires not only provide the last word in smooth and easy riding qualities, but also result in very definite economies.

They save money on upkeep and breakage, effecting material reductions especially in spring breakage.

They develop maximum tractive power in any going, steer easily, and yield unusually long, trouble-free mileage at low tire cost per mile.

Goodyear Balloon Tires for Motorbuses are the final development of Goodyear Pneumatic Bus Tires. In their rugged, active cushioning qualities, they represent the peak achievement of that development which began twenty years ago and has accompanied every progressive move of motorbus transportation since.

Made with SUPERTWIST, the extra-durable, extra-elastic fabric which Goodyear developed especially for the low-pressure tire, Goodyear Balloon Tires demonstrate in motorbus service the superior stamina and finer riding qualities which SUPERTWIST alone provides.

If you want to give your patrons not only a very convenient and economical service, but one that also is superlative from every standpoint of luxurious comfort, equip with Goodyear Balloon Bus Tires.

If you want balloon tires that give you the utmost in trouble-free mileage at low per-mile cost, get Goodyear Balloon Tires, made with SUPERTWIST. They are better balloons, yet they cost you no more.

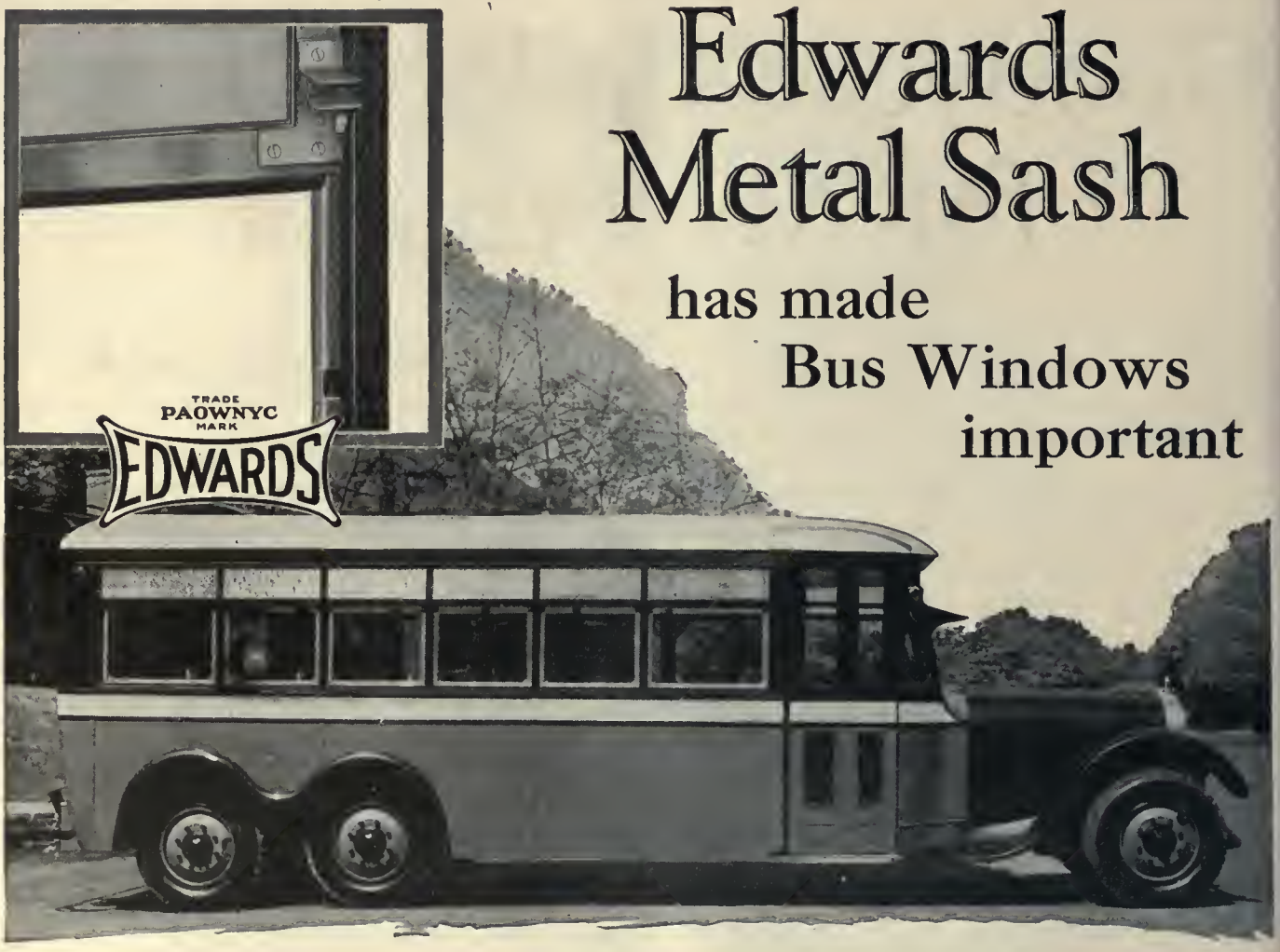
LARGE OPERATORS USING GOODYEAR BALLOON BUS TIRES

Boston Elevated Ry.	Boston, Mass.
Capitol Traction Co.	Washington, D. C.
Colonial Motor Coach,	Watertown, N. Y.
Detroit Motorbus Co.,	Detroit, Mich.
Kansas City Railway Co.	Kansas City, Mo.
Motor Transit Co.	Los Angeles, Cal.
Northern Ohio Power & Light Co.	Akron, Ohio
Northland Transportation Co.	Minneapolis, Minn.
T. M. E. R. & L. Co.	Milwaukee, Wis.

For every Goodyear Cord Bus Tire there is an equally fine Goodyear Tube, built especially to the needs of bus service

Supertwist BALLOONS

Edwards Metal Sash has made Bus Windows important



Bus body by E. J. Thompson Co., Pittsburgh, on "Six-Wheel" Chassis using Edwards Metal Sash.

Edwards Screen Sash adds to the summer comfort of passengers. Edwards Storm Sash helps in heating in winter.

One bus body corporation says in its advertising: "Snug protection or ample ventilation is provided by clear vision windows that close tight or can be raised to let cooling breezes in."

The men in this company know the importance of windows. That is why they use Edwards Metal Sash.

"Clear vision windows." Edwards Metal Sash gives the maximum of glass area, with not even a dirt pocket in the corner.

"Close tight." Edwards Metal Sash fits so snugly that cold air, rain, and dust cannot penetrate.

"Can be raised." Edwards Metal Sash operates with utmost ease, in the manner with which all passengers are familiar. They can use it, but they can't get it out of order.

Edwards Metal Sash has made bus windows important because it has made them perfect—in appearance, in operation, and in economy.

Whether you are body builder, chassis builder, or bus operator, you ought to know all about Edwards Metal Sash. You can, without obligating yourself, and without expense, by sending for our complete booklet.

O. M. EDWARDS CO.

SYRACUSE, N.Y.

Canadian Representatives: LYMAN TUBE AND SUPPLY CO., Montreal and Toronto



ROUTE NO. 1—GREEN LINE TRANSIT COMPANY, CANTON, OHIO.



GARFORD GREYHOUND BUSES

Traffic Control

The increasing traffic on both City Streets and the Open Road demands the best attention of bus operators everywhere. Public opinion frowns on large cumbersome vehicles that require excessive space on thorofares. Bus Operators need the good will of the public. They need to cater to public opinion on this issue. They need to maintain schedules for their patrons, which becomes more of a problem with larger type buses as traffic increases.

A bus with a powerful six-cylinder motor, with a low center of gravity, with a pick-up and get-away, with attractive and harmonious bodies, light in weight and appealing in sight, with quick-acting brakes (particularly the four-wheel hydraulic brakes), can do much for the operator to help in "Traffic Control."

The Garford Greyhound has these qualities. They have set a higher standard for revenue producing.

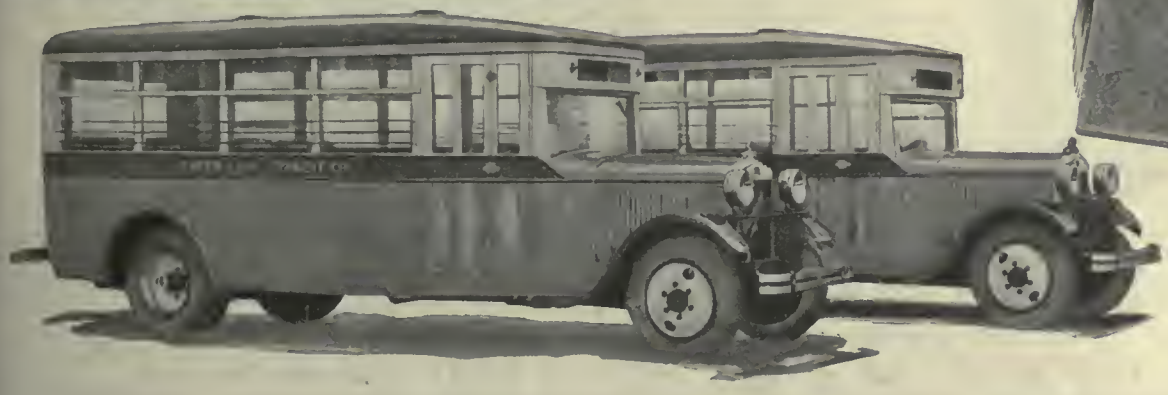
GARFORD PIONEERED 4-WHEEL BRAKES ON MOTOR BUSES

The Garford Motor Truck Co.

637 Wapak Road, Lima, Ohio

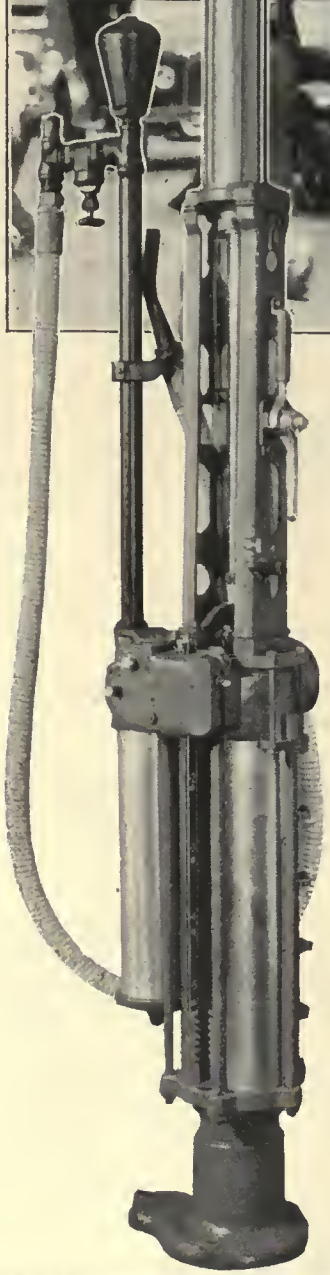
Garford "Quality Built" Buses are described in the booklet here illustrated. You may have a copy for the asking.





BOWSER
ESTABLISHED 1885





Why owning pumps is right!

When you own your pumps, and have adequate underground tanks, you buy gas when the market dips. Your fuel will thus cost anywhere from 4c. to 6c. under the ordinary day-to-day price.

By owning your own equipment, you're master of the situation—you can buy as your judgment dictates, and where you please.

Our engineers know which gas and oil equipment will best serve you, as we have made a special study of bus-fueling requirements. This, together with our long experience in the railway and filling station fields, gives our engineers an unusually broad viewpoint.

For complete booklets, address Dept. 51.

S.F. BOWSER & COMPANY, Inc.
Pump and Tank Headquarters
FORT WAYNE, INDIANA.



There are a few people who must ride in buses but there are thousands who must be coaxed!

The attractive body draws everybody. To the thousands who must be coaxed to ride, Lang Bodies make an irresistible appeal. Every curve of line and every feature of comfort is an invitation.

LANG BODIES

create new passengers



for example –

The staggered seats give an atmosphere of semi-privacy with ample room and clear vision. The rider who needs coaxing yields easily to the suggestion that every luxurious detail has been planned for his or her individual comfort, an impression which Lang Body builders have been developing since the days of fine carriage building.

THE LANG BODY COMPANY
CLEVELAND, OHIO



"After all – it's the Setting that counts!"



These poles will last twice as long as if they were untreated. That's what preservative treatment does.

Vaccinated telephone poles

—an idea that is paying profits to pole users

VACCINATION prolongs human life and pole life. The injection of a special preservative applied at the ground line adds years to the usefulness of a pole from Graybar Electric.

Treated poles are permanent poles and profitable poles. Once they are in the ground they stay in. This helps not alone in saving forests but also in saving money for pole buyers.

In encouraging pole preservation, Graybar Electric continues the work of the Western Electric Supply Department, to which Graybar is the successor in name and in 56 years of electrical experience.



GraybaR

ELECTRICAL SUPPLIES

Successor to *Western Electric* Supply Dept.

Offices in 55 Principal Cities. *Executive Offices: 100 East 42nd Street, New York*

Fort Snelling - Mendota Bridge across Minnesota River near Minneapolis will contain 76,000 cubic yards of concrete. Length 4119 feet. Height, from normal low water to bridge floor, 120 feet.

Walter H. Wheeler, Designing and Consulting Engineer with the C. A. P. Turner Company Associated, prepared the plans and specifications for this job, and is also supervising the construction.



These Engineers Get Quality Concrete Using Economical Mix

QUALITY control jobs now attract attention not because there are few of them, but because there are so many. The Fort Snelling-Mendota Bridge now being built across the Minnesota River near Minneapolis is one of the outstanding examples.

Those in charge of this job are following this basic principle: Assuming a workable mix, the strength of the concrete is determined by the relation which the volume of mixing water bears to the volume of cement.

Field tests, made regularly during the progress of the work, show that predetermined strengths are being consistently obtained.

In addition, grading and proportioning of aggregates within the range of workability are giving the most economical mix and a fine, uniform texture.

Further information about field control will be gladly sent on request, if you will write the nearest office listed below. Ask for a copy of "Design and Control of Concrete Mixtures." There is no obligation.

PORTLAND CEMENT ASSOCIATION

A National Organization to Improve and Extend the Uses of Concrete

Atlanta	Denver	Lincoln, Nebr.	Oklahoma City	Salt Lake City
Birmingham	Des Moines	Los Angeles	Parkersburg	San Francisco
Boston	Detroit	Milwaukee	Philadelphia	Seattle
Chicago	Indianapolis	Minneapolis	Pittsburgh	St. Louis
Columbus	Jacksonville	Nashville	Portland, Oreg.	Vancouver, B. C.
Dallas	Kansas City	New Orleans	Richmond, Va.	Washington, D. C.
		New York		

Follow the "ABC" of Good Paving and You'll get

6 point service

The vitrified brick pavement, asphalt filled,

I
absorbs impact at rail joints

II
water-seals road-bed and ties

III
allows for contraction and expansion

IV
resists heaviest traffic

V
is easily removable

VI
has practically 100% salvage value

NATIONAL PAVING BRICK MANUFACTURERS ASSOCIATION
ENGINEERS BUILDING · CLEVELAND, OHIO

VITRIFIED Brick PAVEMENTS

The "ABC" of Good Paving

A sphalt *for Filler*
B rick *for Surface*
C rushed rock, gravel, crushed slag or concrete *for Base*

—and the "D" is drainage adequate and well-planned

INSIST on A, B, C and D and you have the ideal pavement for track areas. Let's start "from the ground up" and discuss the reasons why.

Drainage, adequate and well-planned, comes first because no material or design can resist the havoc played by faulty drainage with its resultant shifting of sub-soil in spring, summer and autumn and the upward thrust of freezing in the winter.

Next, an adequate foundation—many times a well compacted, sandy soil, but more often a sturdy base of concrete, crushed rock, crushed slag or gravel, according to relative costs and convenience of local sources of supply—overlaid with a uniform bedding course of sand of even density, the whole forming an adequate road-bed when protected from direct impact and abrasion by a top armor of brick.

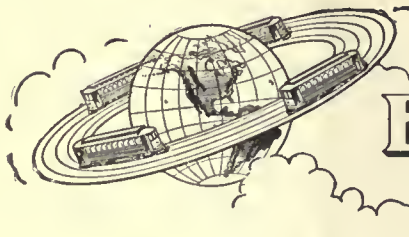
Third, a vitrified brick surface, because it affords the best traffic surface, smooth, yet anti-skid, and because its fire-hardened toughness sturdily resists wear and tear and holds upkeep expense to a minimum.

Fourth; asphalt for filler, because asphalt between the brick seals the surface against water from above, protecting road-bed and ties, provides the elasticity required to forestall cracking and subsequent deterioration, due to temperature and moisture stresses, and makes any section of the pavement, large or small, easily removable for track repairs or maintenance with practically 100% salvage value.

The sum of these four items is the pavement that gives the famous six-point service in electric railway use.

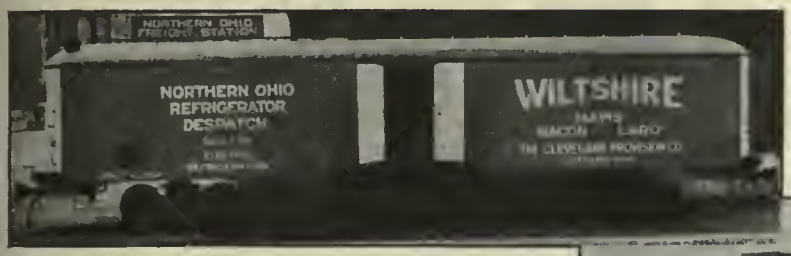
Further data and specific figures on cost and performance on request.

The creation and maintenance of car advertising space values requires the same degree of highly specialized knowledge as the construction and maintenance of railroads. Such tasks should be delegated only to those of widest experience and longest record of success.



Barron G. Collier
INCORPORATED
CANDLER BLDG. NEW YORK

What Phoenix Electric Refrigeration Will Do ~



This is the first Phoenix Electric Refrigerator Car, converted from a standard freight car by The Northern Ohio Traction Co. It carries over 1,000,000 lbs. of perishable products in a year.



Five Phoenix Electric Refrigerator Cars, built by The Cincinnati Car Co., were put into operation by The Chicago, North Shore & Milwaukee Railroad at the beginning of this season.

A BIG field for profit is being developed by electric railways through the use of Phoenix Electric Refrigerator Cars. So successful are these cars proving that their adoption by all forward looking electric interurban lines is inevitable.

Phoenix Electric Refrigerator Cars are superior to ice refrigerator cars in every way. The disadvantages of ice refrigerator cars that have stood in the way of electric railways' putting on refrigerator car service have been entirely eliminated.

The cost of operation is negligible as the refrigerating machinery takes its power from the line.

There is no overhead expense because it is not necessary to build icing stations and provide a cumbersome organization to care for them.

The machinery is fully automatic in operation, requires no special skill to care for it and does not easily get out of order.

Phoenix Transportation Refrigerating Unit





Indoor SpraTower



Phoenix Equipments Easy to Install.

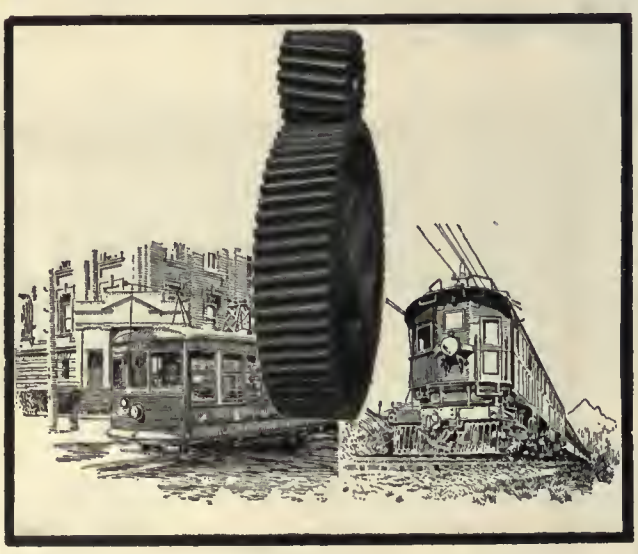
There is nothing difficult or complicated in Phoenix installations. Any standard car can be readily converted into a highly efficient, profit-making electric refrigerator car in your own shops. Our Service Department will co-operate with your mechanical department or with any car builder you may specify in working out the installation.

We shall be glad to give you the fullest particulars.

THE PHOENIX ICE MACHINE CO.
CLEVELAND, OHIO

Nine Times Out of Ten

The quality of Electric Traction Service is in direct proportion to the quality of the equipment employed.



If you are not using Nuttall BP Helical Gears and Pinions, you have a way to a vast improvement in your equipment, and an inevitable improvement in your service.

If you are not using the New Nuttall 20-A trolley base you cannot only improve but can perfect that part of your equipment.

Every improvement in equipment brings a corresponding improvement in service, and every improvement in service shows instantly in more dollars and cents.

Let us send you our literature on the two sure money makers.

R.D. NUTTALL COMPANY
PITTSBURGH PENNSYLVANIA

All Westinghouse Electric & Mfg. Co. District Offices are Sales Representatives in the United States for the Nuttall Electric Railways and Mine Haulage Products. In Canada: Lyman Tube & Supply Co., Ltd., Montreal and Toronto.

Nuttall

Each of your salesmen should have the 1926 Edition—

Electric Railway DIRECTORY

Because:—

All purchases are passed upon by two and often three officials before the order is placed. If your salesmen are not procuring orders they are not interviewing the proper officials.

With 65% changes in this directory over 1925, it is very important your salesmen are directed right to save time and possibly embarrassment.

$296,000,000 will be spent this year for new equipment, material and supplies — can your salesmen afford to make one false step on his introduction?

The above holds true respecting your mailing lists. With six changes for each property listed makes your old mailing list practically worthless.

It is too expensive to have your literature go wrong. In fact the directory pays for itself many times over the first campaign.

Price $7.50 for one copy—

10% off for five or more.

Leading Features

1—Complete list of every recorded electric railway company in the United States, Canada, Mexico, and the West Indies.

2—List and addresses of officials, superintendents, department heads and purchasing agents, corrected to date of issue.

3—Addresses of companies operating buses.

4—Addresses of bus repair shops.

5—Mileage of track and bus routes.

6—Number and kinds of cars used.

7—Rates of fare.

8—Amusement parks owned or reached.

5-1-26

Directory Department, Electric Railway Journal,
Tenth Avenue and 36th St., New York, N. Y.

Gentlemen:—Will you please send me:

.....copies of 1926 McGraw Electric Railway Directory, check for $..... enclosed.

.....More complete information concerning contents.

Name .....

Company .....

Street .....

City .....State .....

PANTASOTE

Trade Mark

Seat and Curtain Materials

There is no substitute for Pantasote

AGASOTE

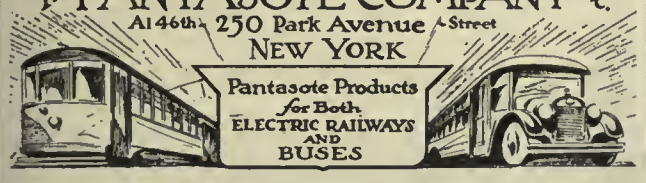
Trade Mark

Roofing—Headlining—Wainscoting

The only homogeneous panel board

standard
for electric railway cars
and motor buses

The PANTASOTE COMPANY Inc.
250 Park Avenue
At 46th Street
NEW YORK



You're having brush trouble

CORRECT IT

USE LE CARBONE CARBON BRUSHES

They talk for themselves

COST MORE PER BRUSH
COST LESS PER CAR MILE

W. J. Jeandron
Hoboken Factory Terminal,
Building F, Fifteenth Street, Hoboken, N. J.

Pittsburgh Office: 634 Wabash Bldg.
Chicago Office: 1657 Monadnock Block
San Francisco Office: 525 Market Street
Canadian Distributors: Lyman Tube & Supply Co., Ltd., Montreal and Toronto

What can this book tell you about winning your public?

¶ Try it yourself for 10 days free and see—

Long's

Public Relations

A Handbook of Publicity

By JOHN C. LONG

Manager of Educational Department, National Automobile Chamber of Commerce; previously on editorial staff of Class Journal Company and of Springfield (Mass.) Union; correspondent Brooklyn Daily Eagle, Christian Science Monitor, etc.

218 pages, 5½ x 8, 92 illustrations, $3.00 net, postpaid

You can get dollars and cents out of this book. It's in line with one of your greatest opportunities for profit.

It's a very useful key to your great customer—the public—the phantom public, the contrary public, the uninformed, and, more often, the misinformed public.

How to inform people—how to pass on the news—that's this book. Newspapers, magazines, house organs, public banquets, conventions, lectures, radio—every modern method—yours to use for results.

A hint, perhaps, in
the nick of time
See it now

Maybe you're grappling with some phase of public relations right now. Fares, jay-walking, automobile traffic, excursion trains, or any of the many other possibilities. Want some useful hints? Clip and mail the coupon!

Mail the coupon only

McGRAW-HILL
FREE EXAMINATION COUPON

McGraw-Hill Book Co., Inc., 370 Seventh Avenue, New York.
You may send me on 10 days' approval Long—Public Relations, $3.00 net, postpaid. I agree to remit for the book or to return it postpaid within 10 days of receipt.

Signed .....

Address .....

Official Position .....

Name of Company .....

(Books sent on approval to retail purchasers in U. S. and Canada only.) E 6-12-26



Real Cost vs. First Cost

"Tool Steel" gears are guaranteed (very conservatively) to last 1½ times as long as Special Quenched; in service tests they are giving 2 to 3 times as long life.

First cost ratio is usually about—

"Tool Steel".....$10.00
Quenched 8.00

Guaranteed Cost of "Tool Steel"

2/3 of $10.00 = $6.66 vs.
$8.00 for Quenched.

Actual Maximum Cost of "Tool Steel"

1/2 of $10.00 = $5.00 vs.
$8.00 for Quenched.

That's why 85% of the Electric Railway Lines buy "Tool Steel" gears and pinions.

The Tool Steel Gear & Pinion Co.
Cincinnati, Ohio



B. A. HEGEMAN, Jr., President H. A. HEGEMAN, First Vice-Pres. and Treas.
F. T. SARGENT, Secretary W. C. PETERS, Vice-Pres. Sales and Engineering

National Railway Appliance Co.

Grand Central Terminal, 452 Lexington Ave., Cor. 45th St., New York.

BRANCH OFFICES

Munsey Building, Washington, D. C. 100 Boylston Street, Boston, Mass.
Hegeman-Castle Corporation, Railway Exchange Building, Chicago, Ill.

RAILWAY SUPPLIES

Tool Steel Gears and Pinions
Anglo-American Varnish Co., Varnishes, Enamels, Etc.
National Hand Holds
Genesco Paint Oils
Dunham Hopper Door Device
Garland Ventilators
Economy Electric Devices Co., Power Saving and Inspection Meters
Fort Pitt Spring and Mfg. Co., Springs
Cutler Hammer Electric Heaters
Flaxlinum Insulation
Anderson Slack Adjusters
Yellow Coach Mfg. Company—Single and Double-deck Buses
Walter Tractor Snow Plows

The DIFFERENTIAL CAR



Standard on 60 Railways for

Track Maintenance
Track Construction
Ash Disposal
Coal Hauling
Concrete Materials
Waste Handling
Excavated Materials
Hauling Cross Ties
Snow Disposal

Use These Labor Savers

Differential Crane Car
Clark Concrete Breaker
Differential Bottom Dump Ballast Car
Differential Car Wheel Truck and Tractor

THE DIFFERENTIAL STEEL CAR CO., Findlay, O.

AMERICAN BRIDGE COMPANY

EMPIRE BUILDING—71 BROADWAY NEW YORK, N. Y.

Manufacturers of Steel Structures of all classes particularly BRIDGES AND BUILDINGS

ALSO STEEL BARGES FOR HARBORS AND RIVERS, STEEL TOWERS FOR ELECTRIC TRANSMISSION, HEROULT ELECTRIC FURNACES, ETC.

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PITTSBURGH, PA. Cincinnati, Ohio Cleveland, Ohio Detroit, Mich.
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Pacific Coast Representative: U. S. Steel Products Co., Pacific Coast Dept. San Francisco, Cal. Los Angeles, Cal. Portland, Ore. Seattle, Wash.

Export Representative: United States Steel Products Co., 30 Church Street, New York.

Bethlehem Products for Electric Railways

Tee and Girder Rails; Machine Fitted Joints; Splice Bars; Hard Center Frogs; Hard Center Mates; Rolled Alloy Steel Crossings; Abbott and Center Rib Base Plates; Rolled Steel Wheels and Forged Axles; Tie Rods; Bolts; Tie Plates and Pole Line Material.

Catalog Sent on Request

BETHLEHEM STEEL COMPANY, Bethlehem, Pa.

BETHLEHEM

WM. WHARTON JR. & CO. INC.
TISCO MANGANESE STEEL TRACKWORK.

Wharton trackwork, in which the famous Tisco Manganese Steel has been used, will be found on the leading railways of the country.

Plant: Easton, Pa.

BUDA
ESTABLISHED 1881

Special Track Work of every description

THE BUDA COMPANY
Harvey (Suburb Chicago) Illinois



"CARNEGIE" for WHEELS AXLES RAILS CROSS TIES



Carnegie Steel Company
PITTSBURGH, PENNA.

Lorain Special Trackwork Girder Rails

Electrically Welded Joints

THE LORAIN STEEL COMPANY
Johnstown, Pa.

Sales Offices:
Atlanta Chicago Cleveland New York Philadelphia Pittsburgh Dallas

Pacific Coast Representative:
United States Steel Products Company
Los Angeles Portland San Francisco Seattle

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United States Steel Products Company, New York, N. Y.

THE BABCOCK & WILCOX COMPANY

85 LIBERTY STREET, NEW YORK

Builders since 1868 of Water Tube Boilers of continuing reliability

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CLEVELAND, Guardian Building
CHICAGO, Marquette Building
CINCINNATI, Traction Building
ATLANTA, Candler Building
PHOENIX, ARIZ., Heard Building
DALLAS, TEX., 2001 Magnolia Building
HONOLULU, H. T., Castle & Cooke Building
PORTLAND, ORE., 805 Gasco Building



WORKS
Bayonne, N. J.
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Makers of Steam Superheaters since 1898 and of Chain Grate Stokers since 1893

BRANCH OFFICES

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NEW ORLEANS, 344 Camp Street
HOUSTON, TEXAS, 1011-13 Electric Building
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SALT LAKE CITY, 405-6 Kearns Building
SAN FRANCISCO, Sheldon Building
LOS ANGELES, 404-6 Central Building
SEATTLE, L. C. Smith Building
HAVANA, CUBA, Calle de Aguiar 104
SAN JUAN, Porto Rico, Royal Bank Building

Instantaneous Registration by the Passenger

ROOKE SYSTEM of fare collection

Meets every condition for all types of cars and buses. The stand device, as shown, adapts it to one-man uses—making register *portable* or *stationary*, at option. Handles nickels, dimes, quarters, or metal tickets, in *any combination*, FLEXIBILITY with CERTAINTY.



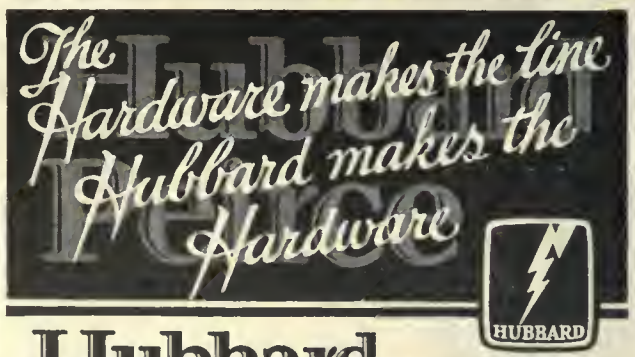
Rooke Automatic Register Company Providence, R. I.

Kalamazoo Trolley Wheels

The value of Kalamazoo Trolley Wheels and Harps has been demonstrated by large and small electric railway systems for a period of thirty years. Being exclusive manufacturers, with no other lines to maintain, it is through the high quality of our product that we merit the large patronage we now enjoy. With the assurance that you pay no premium for quality we will appreciate your inquiries.



THE STAR BRASS WORKS
KALAMAZOO, MICH., U. S. A.



Hubbard and COMPANY
PITTSBURGH • OAKLAND, CAL. • CHICAGO

Arc Weld Rail Bonds

AND ALL OTHER TYPES

Descriptive Catalogue Furnished

American Steel & Wire Company

Chicago, New York, Boston, Cleveland, Pittsburgh, Denver
U. S. Steel Products Co.
San Francisco, Los Angeles, Portland, Seattle

TULC
A LUBRICANT

We make a specialty of
ELECTRIC RAILWAY LUBRICATION
We solicit a test of TULC on your equipment

The Universal Lubricating Co.
Cleveland, Ohio
Chicago Representatives: Jameson-Ross Company, Straus Bldg.



Type R-11
Double Register

International Registers

Made in single and double types to meet requirements of service. For hand or foot, mechanical or electric operation. Counters, car fittings, conductors' punches.

The International Register Co.
15 South Throop Street, Chicago, Illinois

FOR SALE

60 Miles of Interurban Railroad

between Cleveland and Ashtabula, Ohio

70 lb. Standard 6-in. T Rail.
92 mi. "000" Fig. 8 Trolley Wire.
150 mi. 250 M Circular Mill Feeder Copper.
40—Interurban Cars—40 and 50 Seating Capacity.
4—Freight Motor Cars Equipped with Automatic Couplers.
3—Work Cars.
1—2-Ton General Motors Co. Trolley Tower Truck.
1—Wheel Lathe.
1—400 Ton Hydraulic Wheel Press.
1—Type E4 Motor Driven Air Compressor—110 cubic feet of air per minute with 20 H.P. Westinghouse 3 Phase, 60 Cycle, 220 Volt A.C. Motor, Type ORC Automatic Control.
1—25-in. (Stroke 26-in.) Smith & Mills back geared crank Shaper with Table Support, Vise and Counter Shaft.
1—24-in. x 14-ft. Boye & Emmes Instantaneous Change Geared Engine Lathe with all regular equipment.
1—Bolt Threading Machine.
3—Drill Presses.
1—Belt Driven Hammer.
Miscellaneous Tools and Other Equipment such as Air Pit Jacks, Carpenter Shop Machinery, Etc.
5—500 K.W. Westinghouse Rotaries—600 Volts D.C., 6 Phase, 60 Cycles, 1200 R.P.M. —A.C., Self Starting (in service 3 years). Transformers, Meters, Etc.
100—28-ft. Steel Poles.
and all other property used in daily operation.

We invite inspection and inquiries

The Cleveland, Painesville & Eastern Railroad Co.

WILLOUGHBY, OHIO

Why Save It?

Equipment you have replaced, or for which you have no further use can probably be sold at a good price now. Later it may not be worth as much.

Weed out equipment and let a

"Searchlight" Ad

help you sell it promptly

G-9

POSITIONS WANTED

EDITOR - ENGINEER — will edit house organ for transportation company, public utility company, manufacturing company or get up catalogue, advertisements or hostorical booklet or descriptive matter. 3½ years' experience as department editor of magazine and electrical engineer of a number of years standing. A. Barnett Green, Hotel Wellington, Seventh Ave. & 55th St., New York.

FOR SALE

30 Birney Safety Cars

Brill Built

West. 508 or G. E. 264 Motors. Cars Complete—Low Price—Fine Condition.

ELECTRIC EQUIPMENT CO.
Commonwealth Bldg., Philadelphia, Pa.

Rotary Converters

1—500 kw., 600-v., 833 amp., 900 r.p.m., 6-ph., compound wound Westinghouse Rotary Converter, with 3—165 kva., 60-cy., single ph., 13200 v. primary transformers with A.C. and D.C. panels.

1—300 kw., 600-v., 500 amp., 1200 r.p.m., 6-ph., compound wound interpole Westinghouse Rotary Converter, with 3—110 kva., 60-cy., single ph., 13200-v. primary transformere with A.C. and D.C. panels.

GEO. SACHSENMAIER CO.

926 N. Third St., Philadelphia, Pa.

WE OWN AND OFFER—

FOR SALE

ALL EQUIPMENT OF FORMER

NEW YORK & LONG ISLAND TRACTION CO.

Birney Cars
Light Double Truck Cars
Single and Double Truck Sweepers

307 Westinghouse and other railway motors
K-35-G Westinghouse Controllers
Johnson Fare Boxes
Brill Trucks

Electric Welder
Electric Grinder
Concrete Mixer

FOR INFORMATION REGARDING THE ABOVE, WRITE OR WIRE

H. E. SALZBERG CO., INC.

Railway Division

50 CHURCH ST. NEW YORK CITY

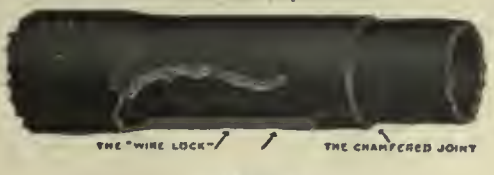
WHAT AND WHERE TO BUY

Equipment, Apparatus and Supplies Used by the Electric Railway Industry with Names of Manufacturers and Distributors Advertising in this Issue

Advertising Agencies
Doyle Kitchen & McCormick
Advertising, Street Car
Collier, Inc., Barron G.
Air Brakes
Westinghouse Air Brake Co.
Anchors, Guy
Elec. Service Supplies Co.
Graybar Electric Co.
Ohio Brass Co.
Westinghouse E. & M. Co.
Armature Shop Tools
Elec. Service Supplies Co.
Automatic Return Switch Stands
Ramapo Ajax Corp.
Automatic Safety Switch Stands
Ramapo Ajax Corp.
Axles
Bethlehem Steel Co.
Brill Co., The J. G.
Carnegie Steel Co.
Illinois Steel Co.
Johnson & Co., J. B.
National Ry. Appliance Co
Westinghouse E. & M. Co.
Axles, Carbon Vanadium
Johnson & Co., J. B.
Axles, Steel
Bethlehem Steel Co.
Carnegie Steel Co
Johnson & Co., J. B.
Ludlum Steel Co.
Babbit Metal
Johnson & Co., J. B.
Badges and Buttons
Elec. Service Supplies Co.
International Register Co.
Barges, Steel
American Bridge Co.
Batteries, Dry
Nichols Lintern Co.
Bearings and Bearing Metals
Brill Co., The J. G.
General Electric Co.
Westinghouse E. & M. Co.
Bearings, Center and Roller Side
Stucki Co., A.
Bearings, Roller
Timken Roller Bearing Co.
Bells & Buzzers
Consolidated Car Heating Co.
Bells and Gongs
Brill Co., The J. G.
Elec. Service Supplies Co.
Graybar Electric Co.
Benders, Rail
Railway Trackwork Co.
Bodies, Bus
Cummings Car & Coach Co.
Graham Bros.
Lang Body Co.
Body Material, Haskelite and Plymetl
Haskelite Mfg. Corp.
Bollers
Babcock & Wilcox Co.
Bolts and Nuts, Track
Illinois Steel Co.
Bond Testers
American Steel & Wire Co.
Electric Service Supplies Co.
Bonding Apparatus
American Steel & Wire Co.
Electric Railway Improvement Co.
Elec. Service Supplies Co.
Graybar Electric Co.
Ohio Brass Co.
Railway Trackwork Co.
Una Welding & Bonding Co.
Bonds, Rail
Amer. Steel & Wire Co.
Electric Railway Improvement Co.
Elec. Service Supplies Co.
General Electric Co.
Graybar Electric Co.
Ohio Brass Co.
Railway Trackwork Co.
Una Welding & Bonding Co.
Westinghouse E. & M. Co.
Book Publishers
McGraw-Hill Book Co.
Brackets and Cross Arms (See also Poles, Ties, Posts, Etc.)
American Bridge Co.
Elec. Ry. Equipment Co.
Elec. Service Supplies Co
Graybar Electric Co.
Hubbard & Co.
Ohio Brass Co
Brake Adjusters
Brill Co., The J. G.
National Ry. Appliance Co.
Westinghouse Tr. Br. Co.
Brake Shoes
Amer. Brake Shoe & Fdry. Co.
Brill Co., The J. G.
Brakes, Brake Systems and Brake Parts
Brill Co., The J. G.
General Electric Co.
National Brake Co.
Westinghouse Tr. Br. Co.
Brick, Paving
National Paving Brick Mfgrs. Assn.
Brick Vitrified
National Paving Brick Mfrs. Assn.
Bridges, Steel
American Bridge Co.
Brushes, Carbon
General Electric Co.
Jeanitron, W. J.
Le Carbone Co.
Westinghouse E. & M. Co.
Buildings, Steel
American Bridge Co.
Bulkheads
Haskelite Mfg. Corp.
Bunkers, Coal
American Bridge Co.
Bus Seats
Hale-Kilburn Co.
Buses, Motor
Brill Co., The J. G.
Cummings Car & Coach Co.
Garford Motor Truck Co.
International Motor Co.
Mack Trucks, Inc.
Reo Motor Car Co.
Yellow Truck & Coach Mfg. Co.
Bushings, Case Hardened and Manganese
Brill Co., The J. G.
Cables. (See Wires and Cables)
Cambric Tapes, Yellow and Black Varnish
Irvington Varnish & Ins. Co.
Carbon Brushes (See Brushes, Carbon)
Car Lighting Fixtures
Elec. Service Supplies Co.
Car Panel Safety Switches
Consolidated Car Heat. Co.
Westinghouse E. & M. Co.
Car Steps, Safety
Irving Iron Works Co.
Car Wheels, Rolled Steel
Bethlehem Steel Co.
Cars, Dump
Brill Co., The J. G.
Differential Steel Car Co.
Cars, Gas, Rail
Brill Co., The J. G.
Cars, Passenger, Freight, Express, etc.
American Car Co.
Brill Co., The J. G.
Cummings Car & Coach Co.
Kuhlman Car Co., G. C.
National Ry. Appliance Co.
Wason Mfg. Co.
Cars, Second Hand
Electric Equipment Co.
Cars, Self-Propelled
Brill Co., The J. G.
General Electric Co.
Castings, Gray Iron and Steel
Amer. Brake Shoe & Fdry. Co.
American Bridge Co.
American Steel Foundries
Wm. Wharton, Jr. & Co.
Castings, Malleable and Brass
Amer. Brake Shoe & Fdry. Co.
Catchers and Retrievers, Trolley
Elec. Service Supplies Co.
Ohio Brass Co
Wood Co., Chas. N.
Catenary Construction
Archbold-Brady Co
Graybar Electric Co.
Ceiling Car
Haskelite Mfg. Corp.
Pantasote Co., Inc.
Ceilings, Plywood, Panels
Haskelite Mfg. Corp.
Cement Products
Portland Cement Assn.
Change Carriers
Cleveland Fare Box Co.
Electric Service Supplies Co.
Circuit-Breakers
General Electric Co.
Westinghouse E. & M. Co.
Clamps and Connectors for Wires and Cables
Elec. Ry. Equipment Co.
Elec. Ry. Improvement Co.
Elec. Service Supplies Co.
General Electric Co.
Hubbard & Co.
Ohio Brass Co.
Westinghouse E. & M. Co.
Cleaners and Scrapers Track (See also Snow-Plows, Sweepers and Brooms)
Brill Co., The J. G.
Ohio Brass Co.
Clusters and Sockets
General Electric Co.
Coil Banding and Winding Machines
Elec. Service Supplies Co.
Westinghouse E. & M. Co.
Coils, Armature and Field
General Electric Co.
Westinghouse E. & M. Co.
Coils, Choke and Kicking
Elec. Service Supplies Co.
General Electric Co.
Westinghouse E. & M. Co.
Coin Counting Machines
Cleveland Fare Box Co
International Register Co.
Coin Sorting Machines
Cleveland Fare Box Co.
Coin Wrappers
Cleveland Fare Box Co.
Commutator Slotters
Elec. Service Supplies Co.
General Electric Co.
Westinghouse E. & M. Co.
Wood Co., Chas. N.
Commutator Truing Devices
General Electric Co.
Commutators or Parts
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General Electric Co.
Westinghouse E. & M. Co.
Compressors, Air
General Electric Co.
Graybar Electric Co.
Westinghouse Tr. Br. Co.
Condensers
General Electric Co.
Westinghouse E. & M. Co.
Condenser Papers
Irvington Varnish & Ins. Co.
Connectors, Solderless
Westinghouse E. & M. Co.
Connectors, Trailer Car
Consolidated Car Heat. Co.
Elec. Service Supplies Co.
Ohio Brass Co.
Controllers or Parts
General Electric Co.
Westinghouse E. & M. Co.
Controller Regulators
Elec. Service Supplies Co.
Controlling Systems
General Electric Co.
Westinghouse E. & M. Co.
Converters, Rotary
General Electric Co.
Westinghouse E. & M. Co.
Conveying & Hoisting Machinery
American Bridge Co.
Copper Wire
American Brass Co.
Amer. Steel & Wire Co.
Anaconda Copper Mining Co.
Copper Wire Instruments, Measuring, Testing and Recording
American Brass Co.
American Steel & Wire Co
Anaconda Copper Mining Co.
Cord, Bell, Trolley Register
Amer. Steel & Wire Co.
Brill Co., The J. G.
Elec. Service Supplies Co.
International Register Co.
Roebling's Sons Co., John A.
Samson Cordage Works
Cord Connectors and Couplers
Elec. Service Supplies Co.
Samson Cordage Works
Wood Co., Chas. N.
Couplers, Car
American Steel Foundries
Brill Co., The J. G.
Ohio Brass Co
Westinghouse Tr Br. Co.
Cranes, Hoists & Lifts
Electric Service Supplies Co.
Cross Arms (See Brackets)
Crossing Foundations
International Steel Tie Co.
Crossings
Ramapo Ajax Corp.
Wm. Wharton, Jr. & Co.
Crossings, Frogs & Switches
Ramapo Ajax Corp.
Wm. Wharton, Jr. & Co.
Crossings, Manganese
Bethlehem Steel Co.
Ramapo Ajax Corp.
Wm. Wharton, Jr. & Co.
Crossings, Track (See Track Special Work)
Crossings, Trolley
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Sachsenmaier Co., George
Salzberg Co., Inc., H. E.
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Derailing Switches
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Wish-Service, P. Edward
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Consolidated Car Heating Co.
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Brill Co., The J. G.
Edwards Co., Inc., The O. M.
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Hale-Kilburn Co.
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Doors, Folding Vestibule
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Dryers, Sand
Electric Service Supplies Co.
Ohio Brass Co.
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Railway Trackwork Co.
Una Welding & Bonding Co.
Electrodes, Steel
Railway Trackwork Co.
Una Welding & Bonding Co.
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Beeler, John A.
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Byllesby & Co., H. M.
Day & Zimmermann, Inc.
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Hemphill & Wells
Holst, Engelhardt W.
Jackson, Walter
Kelker & DeLeuw
McClellan & Junkersfeld
Richey, Albert S.
Sanderson & Porter
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Stone & Webster
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Perey Mfr. Co.
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Wood Co., Chas. N.
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National Railway Appliance Co.
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Electric Service Supplies Co.
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Irving Iron Works Co.
Flooring, Non-Slipping
Irving Iron Works Co.
Flooring, Open Steel
Irving Iron Works Co.
Flooring, Steel Subway
Irving Iron Works Co.
Flooring, Ventilating
Irving Iron Works Co.
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Forgings
Brill Co., The J. G.
Carnegie Steel Co.
Frogs & Crossings, Tee Rail
Bethlehem Steel Co.
Ramapo Ajax Corp.
Wm. Wharton, Jr. & Co.
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Frogs, Trolley
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Ohio Brass Co.
Westinghouse E. & M Co.
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Graybar Electric Co.
Westinghouse E. & M. Co.
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Westinghouse E. & M. Co.
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Brill Co., The J. G
Gauges, Oil and Water
Ohio Brass Co.
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Bethlehem Steel Co.
Brill Co., The, J. G.
Carnegie Steel Co.
Gear Cases
Chillingworth Mfg. Co.
Electric Service Supplies Co.
Westinghouse E. & M. Co.
Gears and Pinions
Bethlehem Steel Co.
Electric Service Supplies Co.
General Electric Co.
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Nuttall Co., R. D.
Tool Steel Gear & Pinion Co.
Generating Sets, Gas-Electric
General Electric Co.
Generators
General Electric Co.
Westinghouse E. & M Co
Girder Rails
Bethlehem Steel Co.
Lorain Steel Co.
Gongs (See Bells and Gongs)
Grating, Steel Subway
Irving Iron Works
Greases (See Lubricants)
Grinders & Grinding Supplies
Metal & Thermit Corp.
Railway Trackwork Co.
Grinders, Portable
Railway Trackwork Co.
Grinders, Portable Electric
Railway Trackwork Co.
Grinding Bricks and Wheels
Railway Trackwork Co.
Guard Rail Clamps
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Wm. Wharton, Jr. & Co.
Guard Rails, Tee Rail & Manganese
Ramapo Ajax Corp.
Wm. Wharton, Jr. & Co
Guards, Trolley
Elec. Service Supplies Co
Ohio Brass Co.
Harps, Trolley
Elec. Service Supplies Co
Nuttall Co., R. D.
Star Brass Works
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Elec. Service Supplies Co.
General Electric Co.
Ohio Brass Co.
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Pantasote Co., Inc.
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Consolidated Car Heating Co
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(Continued on page 48)

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Pantasote Co., Inc.

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Roebling's Sons Co., J. A.

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Nichols-Lintern Co.

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Electric Service Supplies Co.
General Electric Co.
Westinghouse E. & M. Co.

Switches, Tee Rail
Ramapo Ajax Corp.

Switches, Track (See Track Special Work)

Tampers, Tie
Railway Trackwork Co.

Tapes and Cloths (See Insulating Cloth, Paper and Tape)

Tee Rail Special Track Work
Bethlehem Steel Co.
Ramapo Ajax Corp.
Wm. Wharton, Jr. & Co.

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Graybar Electric Co.

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Electric Service Supplies Co.

Tie Plates
Illinois Steel Co.

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Carnegie Steel Co.
W. S. Godwin Co., Inc.
International Steel Tie Co.
Ludlum Steel Co.

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Bethlehem Steel Co.
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Hubbard & Co.
Railway Trackwork Co.

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Metal & Thermit Corp.
Railway Trackwork Co.
Ramapo Ajax Corp.

Track, Special Work
Bethlehem Steel Co.
Buda Co.
Ramapo Ajax Corp.
Wm. Wharton, Jr. & Co.,

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General Electric Co.
Graybar Electric Co.
Westinghouse E. & M. Co.

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Irving Iron Works Co.
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National Railway Appliance Co.
Nuttall Co., R. D.
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Trolley Buses
Brill Co., The J. G.
General Electric Co.
Westinghouse E. & M. Co

Trolley Material, Overhead
Electric Service Supplies Co.
Ohio Brass Co.
Westinghouse E. & M. Co.

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Star Brass Works

Trolley Wheels & Harps
Electric Service Supplies Co.
Star Brass Works

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Amer. Steel & Wire Co.
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Irvington Varnish & Ins Co.

Turbines, Steam
General Electric Co.
Westinghouse E. & M. Co.

Turnstiles
Electric Service Supplies Co.
Ohio Brass Co.
Perey Mfg. Co., Inc.

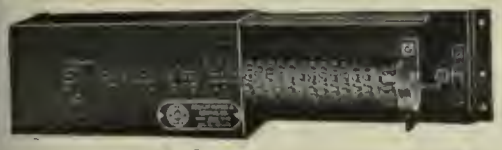
Turntables
American Bridge Co.
Electric Service Supplies Co.

Valves
Ohio Brass Co.
Westinghouse Tr. Br. Co.

Varnished Papers & Silks
Irvington Varnish & Ins Co.

(Continued on page 50)

THE BEST TRUSS PLANK ELECTRIC HEATER EVER PRODUCED



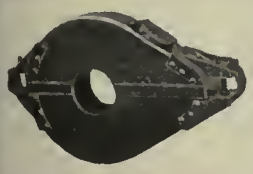
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GOLD CAR HEATING & LIGHTING CO., BROOKLYN, N. Y.



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One-Piece Gear Cases
Seamless—Riveteless—Light Weight
Best for Service—Durability and Economy. *Write Us.*
Chillingworth Mfg. Co.
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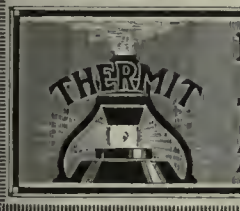
Coin Counting and Sorting Machines
FARE BOXES
Lever-Operated and Slip Change Carriers
The Cleveland Fare Box Co.
Cleveland, Ohio
Canadien Cleveland Fare Box Co., Ltd., Preston, Ont.

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Car Heating and Ventilation
are two of the winter problems that you must settle without delay. We can show you how to take care of both, with one equipment. Now is the time to get your cars ready for next winter. Write for details.
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Better Quality Seats For Cars and Buses
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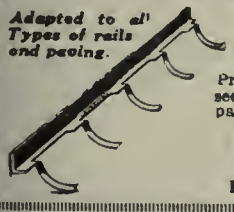
RAIL GRINDERS AND WELDERS
Railway Track-work Co., Philadelphia
682



Eliminate rail joints by THERMIT-WELDING
METAL & THERMIT CORPORATION
120 Broadway, New York City, N.Y.

RAILWAY UTILITY COMPANY
CAR COMFORT WITH UTILITY
HEATERS
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Write for Catalogue
1328 Broadway New York, N. Y.

Adapted to all Types of rails and paving.



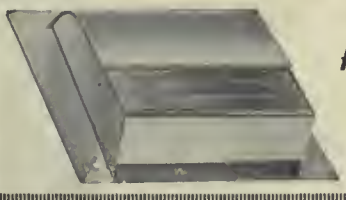
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Proved by service to economically prevent seepage and disintegration of street railway paving.
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Noiseless — direct acting — enlarged friction surface — less parts — stronger — more easily and finely adjusted.
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Chicago

H B LIFE GUARDS
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Manufactured by
CONSOLIDATED CAR FENDER CO., PROVIDENCE, R. I.
General Sales Agents
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Our advertisement in the issue of May 29 showed how
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effected savings in operating cost on the Grand Rapids cars. Another advertisement will appear in the issue of June 19.
HASKELITE MANUFACTURING CORPORATION
133 W. Washington Street, Chicago, Illinois

The Most Successful Men in the Electric Railway Industry read the
ELECTRIC RAILWAY JOURNAL
Every Week



N-L Ventilators
for Cars and Buses
N-L
The Nichols-Lintern Co.
Cleveland, Ohio

ALPHABETICAL INDEX TO ADVERTISEMENTS

A

	Page
Allison Co., J. E.	25
American Brake Shoe & Fdry.	18
American Brass Co., The	47
American Bridge Co.	43
American Car Co.	51
American Electrical Works	47
American Steel Foundries	10
American Steel & Wire Co.	44
Anaconda Copper Mining Co.	47
Archbold-Brady Co.	24

B

Babcock & Wilcox Co.	44
Beeler Organization	24
Bell Lumber Co.	25
Bethlehem Steel Co.	43
Bowser & Co., Inc., S. F.	32
Brill Co., The J. G.	51
Buchanan & Layng Corp.	24
Buda Co., The	43
Byllesby Engineering & Management Corp.	24

C

Cameron Electrical Mfg. Co.	25
Carey Company, The Philip,	Front Cover
Carnegie Steel Co.	43
Chillingworth Mfg. Co.	49
Cleveland Fare Box Co.	49
Cleveland, Painesville & Eastern R. R. Co., The	45
Collier, Inc., Barron G.	38
Consolidated Car Fender Co.	49
Consolidated Car Heating Co.	47
Cummings Car & Coach Co.	21

D

Day & Zimmermann, Inc.	24
Differential Steel Car Co., The	42
Doyle, Kitchen & McCormick, Inc.	27

E

Edwards Co., O. M.	30
Electric Equipment Co.	45
Electric Ry. Equipment Co.	47
Electric Railway Improvement Co., The	25
Electric Service Supplies Co.	9

F

Ford, Bacon & Davis	24
"For Sale" Ads	45

G

Garford Motor Truck Co., The	31
General Electric Co.	22, Back Cover
Godwin Co. Inc., W. S.	49
Gold Car Heating & Ltg. Co.	49
Goodyear Tire & Rubber Co., The	28, 29
Graybar Electric Co.	35

H

Hale-Kilburn Co.	49
Haskelite Mfg. Corp.	49
"Help Wanted" Ads	45
Hemphill & Wells	24
Holst, Englehardt W.	24
Hubbard & Co.	44

I

Illinois Steel Co.	20
International Creosoting & Construction Co.	8
International Motor Co.	16, 17
International Register Co.	44
International Steel Tie Co., The	7
Irving Iron Works Co.	42
Irvington Varnish & Insulator Co.	47

J

Jackson, Walter	24
Jeandron, W. J.	41
Johnson & Co., Inc., J. R.	25

K

Kelker, DeLeuw & Co.	24
Kuhlman Car Co.	51

L

Lang Body Co., The	Insert, 33, 34
LeCarbone Co.	41
Lorain Steel Co.	43
Ludlum Steel Co.	43

M

Mack Trucks, Inc.	16, 17
McClellan & Junkerafeld	24
McGraw-Hill Book Co., Inc.	41
Metal & Thermit Corp.	49
Morton Mfg. Co.	49

N

Nachod and U. S. Signal Co.	47
National Brake Co.	23
National Paving Brick Mfrs. Assn.	37
National Pneumatic Co., Inc.	15
National Ry. Appliance Co.	42
Naugle Pole & Tie Co.	25
Nichols-Lintern Co.	49
Nuttall Co., R. D.	40

O

Ohio Brass Co.	4, 5
Okonite-Callender Cable Company, Inc., The	47
Okonite Co., The	47

P

Pantasote Co., Inc.	41
Perey Mfg. Co., Inc.	47
Phoenix Ice Machine Co., The	39
Portland Cement Assn.	36
Positions Wanted and Vacant	45
Pyrene Mfg. Co., The	25

R

Railway Track-work Co.	49
Railway Utility Co.	49
Ramapo Ajax Corp.	47
Reo Motor Co.	26
Richey, Albert S.	24
Roebling's Sons Co., John A.	25
Rooke Automatic Register Co.	44

S

Sachsenmaier Co., George	45
Samson Cordage Works	47
Salzburg Co., Inc., H. E.	45
Sanderson & Porter	24
Searchlight Section	45
Smith Heater Co., Peter	49
Star Brass Works	44
Stevens & Wood, Inc.	24
Stone & Webster	24
Stucki Co., A.	49

T

Timken Roller Bearing Co., The	19
Tool Steel Gear & Pinion Co.	42

U

Una Welding & Bonding Co.	49
Universal Lubricating Co.	44

W

"Want" Ads	45
Wason Mfg. Co.	51
Westinghouse Elec. & Mfg. Co.	2
Westinghouse Traction Brake Co.	6
Wharton, Jr. & Co., Inc., Wm.	43
"What and Where to Buy"	46, 48, 50
White Eng. Corp., The J. G.	24
Wish Service, The P. Edw.	25
Wood Co., Chas. N.	47

Y

Yellow Truck Coach Mfg. Co.,	Insert, 11, 12, 13, 14

WHAT AND WHERE TO BUY

(Continued from page 48)

Ventilators, Car
Brill Co., The J. G.
Consolidated Car Heating Co.
Nat'l Ry. Appliance Co.
Nichols-Lintern Co.
Railway Utility Co.

Vestibule Linings
Haskelite Mfg. Corp.

Vitrified Brick
National Paving Brick Mfgrs. Assn.

Weatherproofing
Morton Mfg. Co.

Welded Rail Joints
Electric Railway Improvement Co.
Metal & Thermit Corp.
Ohio Brass Co.
Railway Trackwork Co.
Una Welding & Bonding Co.

Welders, Portable Electric
Electric Railway Improvement Co.
Ohio Brass Co.
Railway Trackwork Co.
Una Welding & Bonding Co.
Westinghouse E. & M. Co.

Welders, Rail Joint
Ohio Brass Co.
Railway Trackwork Co.

Welding Processes and Apparatus
Electric Railway Improvement Co.
General Electric Co.
Metal & Thermit Corp.
Nat'l Ry. Appliance Co.
Ohio Brass Co.
Railway Trackwork Co.
Una Welding & Bonding Co.
Westinghouse E. & M. Co.

Welding Steel
Electric Railway Improvement Co.
Railway Trackwork Co.
Una Welding & Bonding Co.

Welding Wire
American Steel & Wire Co
General Electric Co.
Railway Trackwork Co.
Roebling's Sons Co., J. A.

Welding Wire and Rods
Railway Trackwork Co.

Wheel Guards (See Fenders and Wheel Guards)

Wheel Presses (See Machine Tools)

Wheels, Car, Steel & Steel Tire
American Steel Foundries
Carnegie Steel Co.
Illinois Steel Co.

Wheels, Trolley
Elec. Ry. Equipment Co.
Elec. Service Supplies Co
General Electric Co.
Nuttall Co., R. D.
Star Brass Works

Wheels, Wrought Steel
Carnegie Steel Co.
Illinois Steel Co.
Ludlum Steel Co.

Whistles, Air
General Electric Co.
Ohio Brass Co.
Westinghouse E. & M. Co.
Westinghouse Traction Brake Co.

Window Sash, Locks and Racks
Morton Mfg. Co.

Wire Rope
American Steel & Wire Co
Roebling's Sons Co., J. A.

Wires and Cables
American Brass Co.
American Electrical Works
American Steel & Wire Co.
Anaconda Copper Min. Co.
General Electric Co.
Graybar Electric Co.
Okonite Co.
Okonite-Callender Cable Co., Inc.
Roebling's Sons Co., J. A.
Westinghouse E. & M. Co.



Youngstown's "Electric Coaches"

When the Youngstown Municipal Railway recently introduced 13 Modern Cars, handsomely designed and equipped, it recognized the possibilities for increasing the public's riding habit by the use of attractive cars.

In addition to the use of mahogany finish, rubber floor covering, dome lighting, deep spring cushioned seats, and panelling below the vestibule windows to conceal the air piping, these cars are mounted on Brill No. 177-E1 Trucks which guarantees smooth and comfortable riding. Equipped with four 25 Hp. motors, the weight is 33,000 lb.



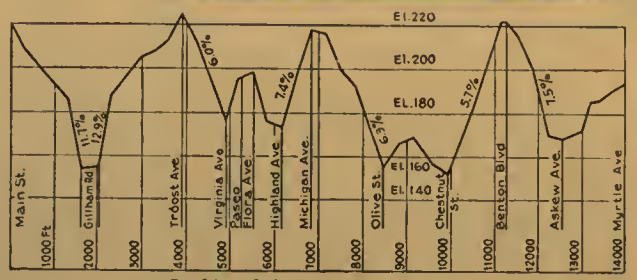
Arranged for one-man two-man operation the new Youngstown cars seat 44 passengers.

THE J. G. BRILL COMPANY
PHILADELPHIA, PA.
AMERICAN CAR CO. ST. LOUIS MO. — G.C. KUHLMAN CAR CO. CLEVELAND, OHIO. — WASON MANF'G CO. SPRINGFIELD, MASS.

Kansas City hills are "easy" for Gas-Electrics

12½% grades!





Profile of 39th St Bus Route

Kansas City has six Gas-Electric Buses with General Electric equipment in regular service on a route which encounters the most severe grades in the city.

Up hill and down, these grades are negotiated with smoothness and absolute safety. No gears to shift; no clutch engagement or release. Electric motors do the work quietly and efficiently; electric braking, on the long downhill runs, relieves brake bands of heating and wear.

Drive an ordinary bus up one of these steep hills in second gear with the inevitable accompanying vibration and noise. Then drive a Gas-Electric Bus over the same route, and its velvet smoothness will be a revelation.

No consideration of bus equipment is complete until you have investigated the operating advantages and the maintenance economies of General Electric gas-electric drive.



One of Kansas City's Gas-Electric Buses making a 12½% grade on its regular run. The buses descend under the perfect control of electric brakes, with no wear on brake drums or linings

General Electric service and warehouse facilities are established in every part of the country, making repair parts and expert assistance available to you on short notice. This asset, which electric railways have long appreciated, should not be overlooked by the other bus operators.

390-5C

GENERAL ELECTRIC

GENERAL ELECTRIC COMPANY, SCHENECTADY, NEW YORK

SALES OFFICES IN ALL PRINCIPAL CITIES

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ELECTRIC RAILWAY JOURNAL



EUCLID AVENUE, CLEVELAND



NAZARETH, PA.

Big City *or* Small Town

THE ready acceptance Twin Ties have in both the large city and small town, make us feel sure we have something to offer both.

The first-cost economy of the Twin Tie design makes the biggest appeal on the small property.

The increased life of track and the renewable design, both based on actual experience and practice, influence the large city properties to use STEEL TWIN TIES.

The volume of Steel Twin Tie Track is, of course, laid in the cities because that is where the volume is.

We have analyzed in the table where the work now in progress is being done, to indicate this more clearly.

May we send Catalog and Quotation?

The International Steel Tie Company
Cleveland, Ohio

Analysis of 28 Twin Tie Installations Now in Progress

CITY-POPULATION	Number of Cities or Towns
1,000,000 and over	2
750,000 to 1,000,000	1
500,000 to 750,000	3
200,000 to 500,000	3
100,000 to 200,000	3
50,000 to 100,000	7
Under 50,000	9

Steel Twin Tie Track

Renewable Track · · Permanent Foundation

B.C.Forbes *Said*

of the Chicago, North Shore and Milwaukee Railroad:



"COURTESY, service and sentiment have paid. Will other traction companies, railroad companies and all other classes of corporations please take note? With perhaps the best equipped suburban line in America, it is equally notable for its mechanical excellence and what might be called its human excellence . . . its unique cultivation of human relationships, of public good will."

The North Shore spent something like $150,000 for purely temporary facilities, to take care of the business of one day. Tomorrow, June 20, perhaps one third of the million people attending the Eucharistic Convention at Mundelein will be moved on the company's cars. Not a penny of profit is expected, but a superhuman effort on this memorable day will add incalculably to the company's good name.

And yet this is just another of the extraordinary services of the North Shore. It holds the Coffin Medal for the most distinguished contribution to the development of electric transportation. But more important, perhaps, in the public view, are the countless individual acts of courtesy by the management and employees.

Courtesy, Service and Sentiment have paid. How well they have paid is best told in figures. During the ten years under Insull-Budd management, the operating income has grown from about a million dollars annually, to nearly seven million dollars in 1925.

Westinghouse Electric & Manufacturing Company
East Pittsburgh Pennsylvania
Sales Offices in All Principal Cities of the United States and Foreign Countries

Westinghouse

MEMBER ELECTRIC MANUFACTURERS ASSOCIATION AERA 1926

The Chicago, North Shore and Milwaukee Railroad is almost entirely Westinghouse equipped. Westinghouse takes a pardonable pride in the success of this road, and the part that Westinghouse equipment plays in the performance of this high degree of service.

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Vol. 67
No. 25

CONTENTS

Pages
1037-1082

JUNE 19, 1926

Editorials 1037

Opportunity Lies Ahead in Local Transportation . 1040

At the second sectional conference in New York, prominent executives point to opportunities that have developed from recent difficulties. Broadened vision and increased courage needed to grasp significance of new order of things brought about by evolution in transportation.

Copper Used in Electrification of C., M. & St. P. Railway 1042

By R. BEEUWKES.

The amount of copper per mile used in this electrification shows the important part which this metal bears in any electrification undertaking.

Skokie Valley Route Gives North Shore Line Widened Territory and Improved Facilities 1043

Ten million dollar high-speed cutoff of the Chicago, North Shore & Milwaukee Railroad represents economical combination of railroad and power line right-of-way, catenary overhead construction, full automatic substations with supervisory control, modern all-electric interlocking plants and high-speed roadbed provided on 22½-mile new route.

Maintenance Costs Reduced in Fort Worth 1048

Insurance Labels for Cars 1049

Cars Remodeled on Central London Railway 1050

High Standard of Bearing Maintenance Gives Long Gear Life 1051

By A. E. ROBERTS.

After an average service of 505,000 miles per gear, the maximum tooth wear found was 0.008 in. and the majority showed wear between 0.002 in. and 0.005 in. on electrified lines of the Southern Railway, England.

Bevel Gear and Worm Drives on Cars 1053

Several two-axle designs have been developed using both one and two motors. Experiments are being carried on by several railways.

Car and Crankcase Oil Reclaimed in Washington . 1055

The new oil and waste reclaiming plant for the Washington Railway & Electric Company reclaims crankcase oil for approximately 14 cents per gallon and car oil for from 5 to 6 cents per gallon.

European Studies of Rail Corrugation 1056

Dick Prescott Gets a Summons 1057

Maintenance Notes 1058

New Equipment Available 1061

Association News and Discussions 1062

America on Wheels 1062

Samuel M. Vauclain attributes prosperity of this country to tireless energy of transportation people. Buses and trucks will make more business for transportation interests.

Budgetary Control of Electric Railways 1063

By H. C. PATTEN.

Detailed estimates of receipts and expenditures for the year prepared in advance make possible a close check on operations and result in large savings.

Dipping and Baking Is of Great Value in Severe Service 1066

By D. CHENARD.

American Association News 1067

News of the Industry 1068

Recent Bus Developments 1074

Financial and Corporate 1076

Personal Mention 1079

Manufactures and the Markets 1080

Keeping Out of the Rut

MAINTENANCE practices, above all other electric railway activities, are constantly in danger of getting into a rut. Although there is a steady pressure to keep costs to a minimum, the average maintenance executive has comparatively little time to devote to the development of new methods for improving results and reducing costs.

It is only by taking advantage of every good idea developed by others, that those responsible for maintenance work can keep up in the race of cutting costs while at the same time improving the condition of the physical property.

Under the heading "Maintenance Notes" ELECTRIC RAILWAY JOURNAL conducts a clearing house for such ideas. These items represent the results of experience on many properties. They offer the maintenance executive weekly suggestions for keeping out of the rut.

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Journal of Electricity
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Change of Address—When change of address is ordered the new and the old address must be given, notice to be received at least ten days before the change takes place.
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SAVING THE RAIL SAVES THE RAILWAY

A bigger job for the maintenance man

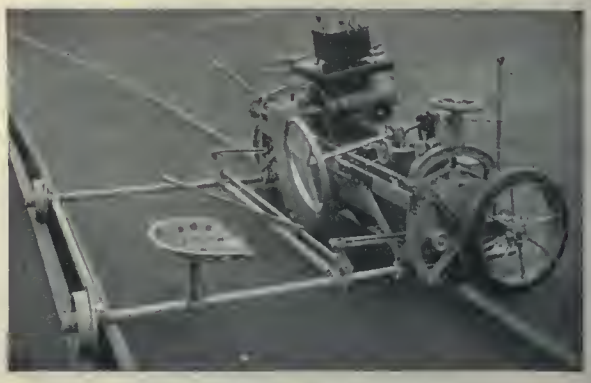
Progressive maintenance men are today looking at their work from a merchandising perspective.

Whether the immediate interest is maintenance of track, equipment or overhead line, the opportunities for helping to sell rides are present on every hand.

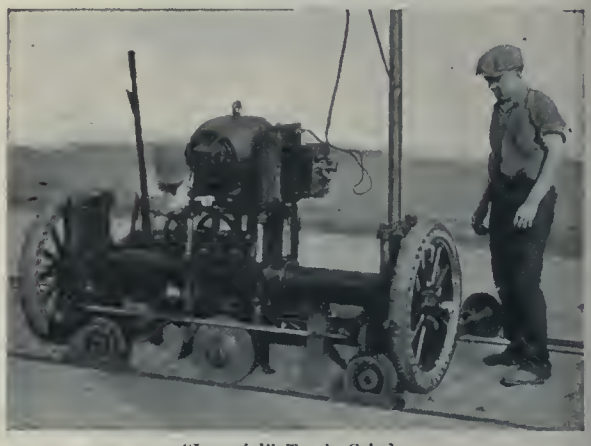
In proportion as he accepts this modern viewpoint and puts it into practice will the maintenance executive rise to his present opportunity.

In no department more than maintenance of way are there greater opportunities to help sell rides. Good track is the foundation of good service—literally and figuratively.

And good service
is the best seller.



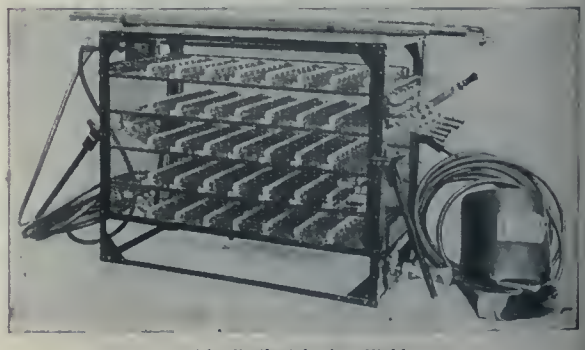
"Improved Atlas" Rail Grinder



"Imperial" Track Grinder



Reciprocating Track Grinder



"Ajax" Electric Arc Welder

Railway Track-work Co.

3132-48 East Thompson Street, Philadelphia

AGENTS:

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Chas. N. Wood Co., Boston
Electrical Engineering & Mfg. Co., Pittsburgh
H. F. McDermott, 208 S. LaSalle St, Chicago
Equipment & Engineering Co., London
P. W. Wood Railway Supply Co., New Orleans, La.
Frazar & Co., Japan

1189

SAVING THE RAIL SAVES THE RAILWAY



C·E·R·A. Ahoy!

ON your fifth Great Lakes Cruise aboard the S.S. South American, O-B extends best wishes for a pleasant cruise and worth while convention.

May the weather be fair and the Lakes smooth; and may your meetings prove a source of inspiration that will carry C. E. R. A. members to ever greater achievement in the public service.

The Electric Railway Industry has cause for pride in the accomplishments of the Central Electric Railway Association. Serving as you do an immense, well populated territory with city lines, buses and over 5300 miles of inter-connected interurban railway, the industry finds much of interest in your discussions. These lead to solutions of problems common to all.

C. E. R. A. members have another interest in common. With O-B line materials and car equipment almost standard in the territory, they are in position to speak a common language when discussing ways and means of providing economical and reliable service.

—and
"O-B—good!"

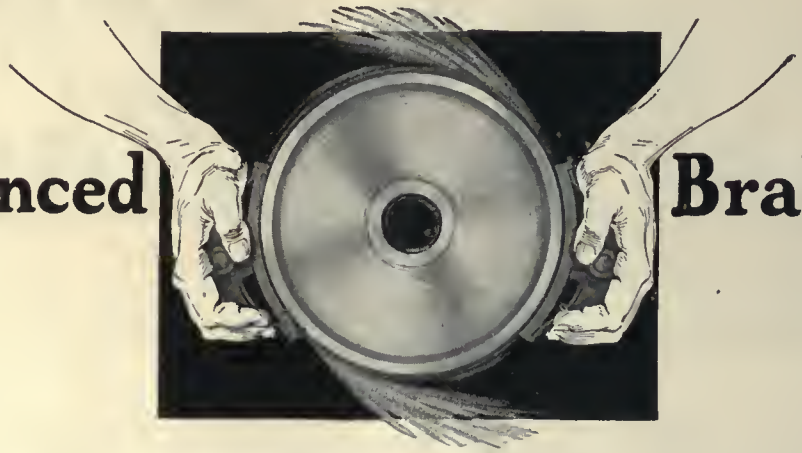
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Ohio Brass Company, Mansfield, O.
Dominion Insulator & Mfg. Co., Limited
Niagara Falls, Canada

Ohio Brass Co.

PORCELAIN INSULATORS
LINE MATERIALS
RAIL BONDS
CAR EQUIPMENT
MINING MATERIALS
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Balanced Braking



In line with modern principles

Higher rates of retardation are demanded as a part of the program of speedier suburban and street railway service. With two brake shoes per wheel instead of one, the clasp brake is admirably suited to producing maximum retarding effect, with minimum strain and wear on truck and journal parts.

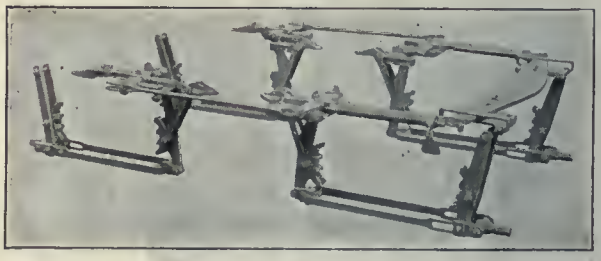
Balancing the heavy braking forces on opposite sides of the wheel has many advantages

1. **Less journal box wear.**
2. **Permits wheel to follow freely, vertical inequalities in track.**
3. **Makes use of flanged brake shoes practical.**
4. **Higher co-efficient of friction.**
5. **Divides energy absorption between two shoes, thus reducing heating effect from brake application.**
6. **Reduces frequency of brake shoe replacements on the car.**

AMERICAN STEEL FOUNDRIES

NEW YORK CHICAGO ST. LOUIS

American Multiple Unit Clasp Brake





The Connecticut Company's cars and buses equipped with Hunter-Keystone Signs—

The Connecticut Company's coordinated transportation service is furnished with rolling stock clearly marked as to routes and destinations.

You, too, can improve your service and "Tell the public where you're going" by means of similar Hunter-Keystone Signs.

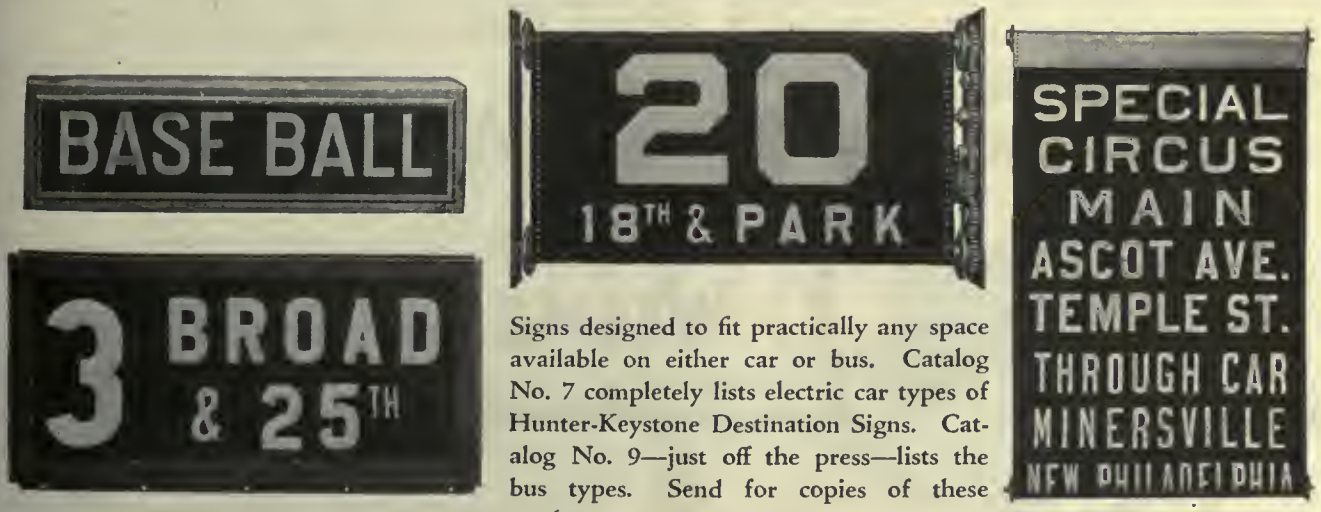
ELECTRIC SERVICE SUPPLIES CO.

PHILADELPHIA 17th and Cambria Sts. | NEW YORK 50 Church St. | CHICAGO Illinois Merchants' Bank Bldg.

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Signs designed to fit practically any space available on either car or bus. Catalog No. 7 completely lists electric car types of Hunter-Keystone Destination Signs. Catalog No. 9—just off the press—lists the bus types. Send for copies of these catalogs.

Typical Hunter Sign Curtain



Light weight double truck Safety Car operated by the city of St. Petersburg Fla.

THE SAFETY CAR—

—is an exemplification of modern safety and economy in street railway equipment.

Safety Car Control Equipment interlocks the power, brake and door control functions to combine ease and convenience of operation with positive safety. Greater convenience is realized because both brakes and doors are controlled by the manipulation of a single operating handle, and because selective door control is possible. Greater safety is assured because careless or promiscuous door opening is prevented, the car must be stopped before the doors can be operated, the doors must be closed before the car can be started, and release of the controller handle, through motorman's negligence or disability, cuts off the power and applies the brakes automatically.

Safety Cars bridge the gap between ordinary precaution and positive safety, stimulating public appreciation through the medium of safe, adequate, accelerated service that follows with the obvious economic advantages of Safety Car installations.



SAFETY CAR DEVICES CO.
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Thirty buses of this type, operated by the Cleveland Railways, are equipped with Westinghouse Air Brakes

Modern buses should have WESTINGHOUSE AIR BRAKES

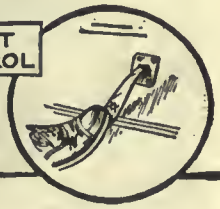
Westinghouse Air Brakes develop a retarding force sufficiently powerful for stopping even the heaviest bus quickly to increase safety and permit faster schedules—provide automatic equalization to minimize skidding and lengthen life of brake linings—relieve the driver of braking fatigue to increase safety and utility—and permit use of metal brake linings to provide still greater safety and economy.

Westinghouse Air Brakes provide the same element of control now safeguarding railway travel—are operating successfully on more than 2000 automotive vehicles under all conditions — receive Westinghouse service in all principal cities—are becoming increasingly popular with bus operators—and are being installed as standard factory equipment or on specification, by all leading automotive builders.

WESTINGHOUSE TRACTION BRAKE CO.
AUTOMOTIVE DIVISION
General Offices and Works, WILMERDING, PA.



WESTINGHOUSE *Automotive* AIR BRAKES





Seats that satisfy the public—

To satisfy the public is to sell more rides on both car and bus. For you get not only those who have to ride but also those who might not otherwise ride.

Backed by half a century's seat-making experience, Hale-Kilburn Seats satisfy both rider and operator. Correct design assures comfort on the longest trip. Sound construction guarantees simplicity, minimum weight, and long, hard wear.

Our catalog describes and illustrates the various types for car and bus. *Write for a copy.*



Typical bus seat
No. 901 Double Chair—a graceful, comfortable double chair with divided back and spring cushion pads.



Typical car seat
No. 392-EE—the finest type of interurban car seat with extra high three-part head-roll and mahogany capped arm-rest.

HALE-KILBURN COMPANY

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Equipment Sales Corp'n, Railway Exch'g Bldg., St. Louis
E. A. Thornwell, Candler Bldg., Atlanta
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Chris Eccles, 320 S. San Pedro St., Los Angeles
T. C. Coleman & Son, Starks Bldg., Louisville
W. L. Jefferies, Jr., Mutual Bldg., Richmond
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Hale and Kilburn SEATS



Harmony with durability

WITH the American woman's ever increasing interest in the decorative and illuminating possibilities of portable electric lamps, there has come a new appreciation of quality and color harmony. in lamp cords.

Women are discriminating buyers, and the electrical industry is fast learning through them that it pays to build feminine good will with cords that harmonize and cords that wear.

It is only natural then that the dependable quality and wide range of attractive colors offered in Rome Lamp Cords should result in a growing demand.

Rome mills, covering 20 acres of manufacturing floor space, are given over to the production of copper wires and cables. Every operation, from the rolling of the wire bar, to the application of the last insulation or protective covering, is under Rome supervision.

Type "PO" Parallel Lamp Cord

ROME WIRE COMPANY, ROME, N.Y.

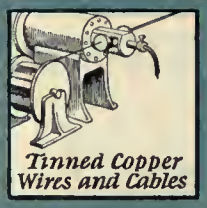
ROME WIRE

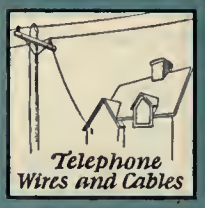
FROM WIRE BAR TO FINISHED COPPER WIRE

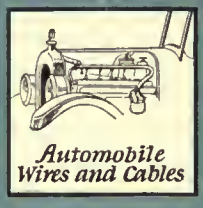

Antenna Wire


Weatherproof Wires and Cables

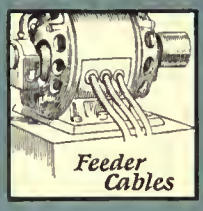

Trolley Wires and Cables


Tinned Copper Wires and Cables


Telephone Wires and Cables


Automobile Wires and Cables


Slow Burning Wires

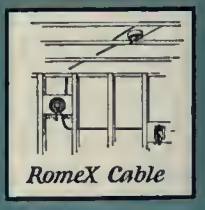

Feeder Cables


Super Service Cords and Cables


Extra Flexible Wires and Cables

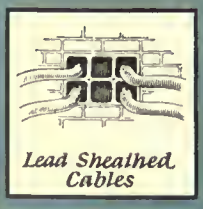

Rubber Covered Wires—Code 30% Intermediate


Heater Cords

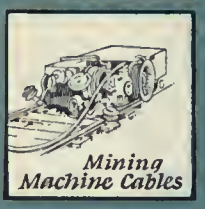

RomeX Cable

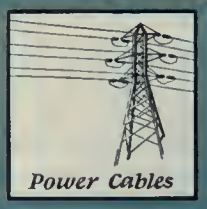

Lamp Cords


Copper Rod and Bare Copper Wire


Lead Sheathed Cables


Magnet Wire


Mining Machine Cables


Power Cables


Radio Wires and Cables

WHILE Rome Lamp Cords are built to harmonize with the most luxuriant surroundings, Rome Super Service Cords are built to stand the gaff of daily use in shops and mines. Each of the other Rome flexible cords—and there are many of them—are built to meet specific working conditions.

But, into every Rome cord, wire, or cable is built Rome quality.

The Rome organization with a thorough understanding of the application of wires and cables for the job, backed with 20 years' manufacturing experience, stands ready at all times to help you solve your wire and cable problems.

If you will let us know in what wires and cables you are interested, we will be glad to send you samples, catalogs, and other information that will be of help to you.



ROME WIRE COMPANY

Mills and Executive Offices: ROME, N.Y.

Diamond Branch: Buffalo, N.Y.

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Boston—Little Building
Chicago—14 E. Jackson Blvd.
Detroit—25 Parsons Street
Cleveland—1200 W. 9th Street
Los Angeles—J. G. Pomeroy, Inc., 336 Azusa Street
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STATE AND MADISON STREETS, CHICAGO

NP

Jay Walkers and Jay Boarders

Even the most rigid traffic regulations cannot safeguard the jay walker who attempts to cross a street at the wrong time. National Pneumatic Door and Step Controlling Mechanisms have, however, made it safe for him to board a trolley car.

He finds, for instance, that doors are opened only when the car is brought to a full stop and closed again —with step drawn in—before the car is set in motion. It is impossible for Mr. Jay Walker to attempt to board or to alight at the wrong time.

NATIONAL PNEUMATIC COMPANY

Executive Office: 50 Church Street, New York
General Works: Rahway, New Jersey

MANUFACTURED IN

CHICAGO
518 McCormick Building

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Railway & Power Engineering Corp., Ltd.

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MACK
PLAINFIELD PLANT



ALLENTOWN, PA. Ground Area—132 acres
Floor Space—926,463 sq ft.

Ground Area—8½ Acres
Floor Space 315,300 sq. ft.



NEW BRUNSWICK, N. J. Ground Area—17 acres
Floor Space—486,260 sq

Pat. Off.

What's behind the Bus you buy?

The impartial observer sees *Mack* engines being built at Plainfield

Here, at Plainfield, N. J., he saw the sturdy Mack engines being built completely from the raw material. Here he also saw the great dynamometer engine test shop, and many other interesting processes. His impressions follow—

"To see castings, forgings and raw material come together so skillfully to form the Mack engine gave me a good idea of the true meaning of Mack performance.

"I never realized to what close tolerances engine manufacture is held — as checked by Mack. Any manufacturer who uses diamond cutting tools for finishing bushings is certainly thinking foremost of road performance.

"And after that grueling dynamometer test, no wonder you can stand safely behind every engine that leaves your plant and goes to Allentown for assembly. Mack crank pins are as beautiful a piece of finished work as I have ever seen and the way you match parts in assembly with regard to matched tolerances shows a care that helps explain the meaning of long mileage with profit to Mack owners."

Visit the Mack plants yourself, if you can, or let the direct Mack factory branch nearest you show you the finished job which the impartial observer inspected in every stage of manufacture. A demonstration over your route will prove that Mack plans and builds for *service on the road.*

MACK TRUCKS, INC.
INTERNATIONAL MOTOR COMPANY
25 Broadway, New York City

One hundred and seven direct MACK factory branches operate under the titles of: "MACK MOTOR TRUCK COMPANY," "MACK-INTERNATIONAL MOTOR TRUCK CORPORATION," and "MACK TRUCKS OF CANADA, LTD."

The Mack Bus





Speeding up service

To Speed up service—and yet maintain accuracy of collections—is a problem well solved by the use of

GLOBE

Tickets--Transfers--Passes

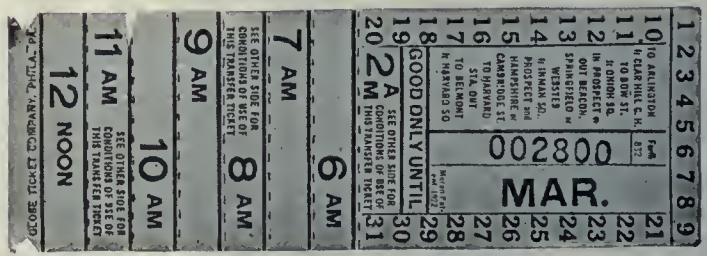


Designed by specialists for all standard and special requirements. Ask for further particulars and samples of our work.



GLOBE TICKET COMPANY
116 N. 12th Street, Philadelphia, Pa.
Los Angeles New York San Francisco





Moran Patent Transfer

No Adjustments - - - automatically self-equalizing

The money spent on inspecting, adjusting, and equalizing bus brakes, as well as on brake "Road Service Calls" would look better as profit. The greater portion of it can be saved; and safer, more effective braking obtained at the same time. A braking system which maintains its equalization automatically, by the very nature of the principle upon which it is built, and that has sufficient "follow-up" to take care of all wear to the liner and drum expansion is the answer.

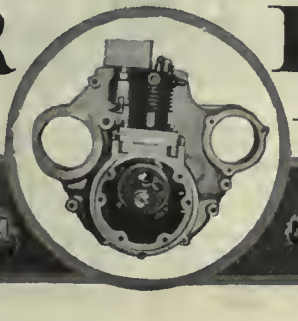
The only power brake that fits this description is the Christensen Air Brake. None other has its power actuating mechanism INSIDE the brake drum, with no outside levers, pull rods, cams, knuckles, universals; no mechanical "equalizers"; and having ample "follow-up" to take care of drum expansion and wear to the brake liner during its entire life.

This method of application and the total absence of outside brake rigging on the chassis is not simply a detail of mechanical construction. It is a matter of construction principle, a principle exclusive with the Christensen brake, and is vital to low-cost brake maintenance.

Testimony to its value is the fact that no equalizing or adjusting is required from the time the brakes are originally set up until the liners are completely worn out. Every operator knows what this will save him in "Road Service Calls" and routine shop maintenance.

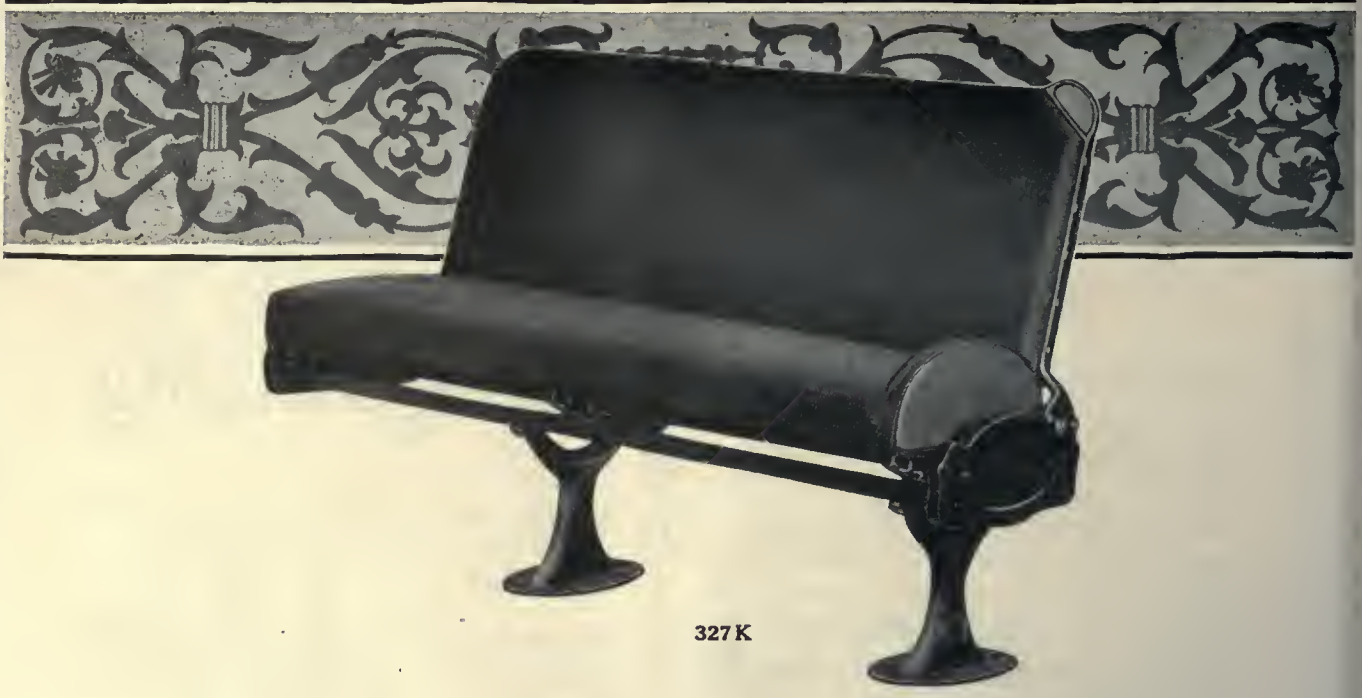
[NO ADJUSTMENTS—Specify Christensen Air Brakes on the Buses You Buy]

Christensen AIR BRAKES



CHRISTENSEN AIR BRAKE CO.,
6513 Cedar Ave. Cleveland, Ohio

100 · YEARS · OF · MANUFACTURING · EXPERIENCE ·



A New H-W Seat for Gas-Electric Cars

That Heywood-Wakefield seating engineers keep step with every new demand in passenger transportation is evidenced by this new Gas-electric car seat.

This model of reversible seat may be had for two or three passengers, with or without arm rests and upholstered to suit service conditions. No. 327K has been adopted by some of the large eastern roads and is certain to prove a popular item of the complete H-W passenger-seating line.

Why not consult with H-W experts on your present seating problems? Consultation costs you nothing.

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The G. F. Cotter Supply Co.,
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Heywood-Wakefield Company,
439 Railway Exchange Bldg., Chicago, Ill.

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Railway & Power Engineering Corporation
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UNITED STATES TIRES ARE GOOD TIRES



If You Had Your Tires Built to Order—

You would go to tire engineers who have the widest experience in building bus and motorcoach tires.

United States Tire Engineers who built the Royal Cord Motorcoach Tire also designed the first pneumatic bus tire. Their experience covers every important development in the field.

You would give instructions to build a tire that would give the lowest possible cost per tire mile.

That is exactly the order given for building the Royal Cord Motorcoach. Exceptional engineering skill was combined with all the resources of the world's largest growers and manufacturers of rubber to make this tire the most economical long-mileage tire it is possible to build.

Here is *the modern tire for the modern motorcoach.* The name "Motorcoach" on the tire shows its *specific* purpose.

United States Rubber Company
Trade Mark

UNITED STATES
ROYAL CORD
Motorcoach



Grade M

More miles per dollar

Not merely the mileage of a few picked sets which have achieved a record, but mileage uniformly good must determine the "miles per dollar".

Gears and pinions which give high mileage with minimum wear under service conditions are the ones that operate for the lowest cost per car-mile. This is the criterion by which to purchase railway gearing.

Long experience, aided by necessary research, has produced a gearing of this properly balanced quality—ample hardness to resist wear, but without brittleness.

This is General Electric, Grade M Gearing.

G-E Railway Gearing has every advantage that research in metallurgy can offer and every known facility is utilized for producing a product of the best possible material, and for testing its quality before shipment. These facts account for Grade M stamina.



For

Modern Equipment Standards

54C-35

GENERAL ELECTRIC

Electric Railway Journal

Consolidation of Street Railway Journal and Electric Railway Review

Published by McGraw-Hill Publishing Company, Inc.

CHARLES GORDON, *Editor*

Volume 67 . . New York, Saturday, June 19, 1926 *Number* 25

Squeaks and Rattles Tell Their Own Story

ONE good thing there is about noise and only one—it tells when something is wrong. A car pounding its way over track or special work indicates that there is something wrong with the track and that it should be fixed. A noisy gear or rattling truck part says that destructive wear is taking place and that the car should go to the shop.

Every moving part on the car is a potential source of noise. The possibilities are that any one car will have many noise-producing elements. Consequently the only way to overcome the tendency to wear excessively and so increase the noise that will be produced is to maintain close fits, have the machine work accurate and the parts tight.

It was a wise Providence that so regulated our sensibilities that noise gets on our nerves. Were it not true it is quite possible we would blindly let the uneconomic wear go on until actual destruction occurred. But as it is, not nearly enough attention is paid to the warning that is given by the squeaks and rattles that develop in time even in the best of equipment.

Arrangement of Material in Storeroom Has Bearing on Its Efficiency

SOME remote corner of the car repair shops, too dark for satisfactory maintenance work, often is considered by the railway management as a good enough location for the storeroom. Row after row of wooden bins extending from floor to ceiling prevent the little light that enters from penetrating far. An atmosphere of gloom pervades the whole place.

The harmful effects of this practice are twofold. No one can do his best work among such surroundings. The morale of the storekeeper and his assistants suffers on account of the dismal appearance of their workshop. Worse than that, however, is the loss of time spent in searching for material tucked away somewhere at the back of a dark bin.

Good storekeeping requires that the quantities of materials and supplies on hand be known at all times. While this is largely a matter of keeping accurate records, it is also necessary to make more or less frequent physical inventories. Dark or inaccessible storage bins greatly hamper this process.

Wire screening in place of solid boards not only makes it easier to see the material in storage but also permits better penetration of light and air. White paint will do much to brighten up the average storeroom. The unit-piling system facilitates the making of inventories. Railways which have modernized their storerooms along these lines have found that the improvement is worth all it costs.

Executives' Conference Attendance Raises Some Questions

THIS is no time to mince words in the local transportation industry. Fundamental changes are taking place. The industry is in the midst of one of those periods of deep-seated readjustment which come to all businesses at one time or another. A strong current of changed conditions has set in. Those who recognize the trends and set their course accordingly will ride on to widened opportunity and greater accomplishment. But those who neglect to recognize the current of progress will be swept into the eddies of stagnation and their places will be taken by new and keener men.

In the discussion at the second Advisory Council conference held in New York on June 10 and 11, which is abstracted elsewhere in this issue, there was evidence of the rise of a broader and stronger current in the industry. Words were not minced. It was far from a mutual admiration session. Men high in financial and utility circles spoke plainly but constructively—and hopefully. There were few platitudes. There was little beating about the bush.

The primary purpose of these meetings has been to afford an opportunity for the frank discussion of current railway problems and an interchange of ideas on how to meet them. Men who control the destiny of many properties gave liberally of their time and thought for the good of the industry. They came both to talk and to listen to the managers' difficulties. An owner-manager conference—surely that is desirable. But of the executives who indicated their acceptance of the invitation to attend this latest meeting, considerably fewer than half attended.

One seeks in vain for an explanation of this lack of interest. Surely the industry has plenty of problems ahead. Why, then, the apathy toward such a meeting? Is there nothing to be learned from one's neighboring property? Have the absent managers no ideas which they wish to check or exchange with others in a similar situation? The present condition of the electric railway industry calls for vision, broadened thinking and determination to find ways of effecting improvements. Are some managements too well-satisfied with their own opinions? Or do they lack initiative or energy or confidence in their own business? Are they inclined to drift? Are they overlooking their responsibility for finding ways and means to bring about improvement

This is the issue in June that is devoted essentially to maintenance subjects

and to put their properties on a paying basis? Have they become so saturated in detail and precedent as to lose necessary perspective and vision?

In the answers to these questions there may be explanations for some of the industry's difficulties.

What Kind of Courage?

COURAGE, and whether the industry has it, seemed to arouse a bit of healthy discussion at the recent Advisory Council meeting in New York. Several speakers said we need courage to proceed. Others remarked that the exposition of courage in the past was an outstanding factor in the romantic history of the industry.

Both contentions are well founded. It takes courage to stick in the front line trench when the fire of battle rages around you. It takes courage to stick at a job when everything goes dead wrong. But another kind of courage is necessary on the part of the officer in charge when he decides that the tactics must be changed from defensive to offensive. When the executive of an industry finds that his product is not holding its own in popularity, it takes courage to look it over critically to determine what is wrong and then to strike at the heart of the trouble.

One is the courage to perform at all odds; the other to create. One, the task of the operator; the other, of the executive. Electric railway history of the past is replete with the former, but what we need today and are beginning to see is the courage to create anew.

Bringing Work to the Machine or the Machine to the Work

REPAIRS to electric rolling stock present a difficult problem. The time available for making them is limited, as most railways need all cars possible for service during the morning and evening peak periods. This makes it hard to keep down the number of nonproductive hours in the railway shop. Maintenance men realize that makeshift repairs are only a waste of time and that careful work is needed to keep rolling stock in revenue service for long periods and to prevent annoying delays on the road which disrupt schedules. These men would like to have the best machine tools provided for doing the work and plenty of time to do the jobs well.

Portable machines are being used in electric railway shops to a limited extent and for some classes of repair work they are proving satisfactory and economical. There seems to be quite a widespread feeling among master mechanics and shop superintendents, however, that better work will result if it is done on a stationary machine.

The advantage of portable machines is that repairs to equipment can frequently be made without dismantling it completely and no time is lost in carrying the parts to and from the machine shop or wood mill. As regards the actual repair work, it can be done quicker and probably better if the part is removed and taken to a machine.

The most satisfactory results will be obtained by laying out a definite repair schedule for work that is sure to be repeated regularly. Sufficient spare parts will insure that the schedule is maintained and that the needed time for repairs is available. By providing material-handling equipment and labor-saving devices a balanced production will be assured and best use can be made of the existing machine tools. To take care of emergency repairs, crippled cars, etc., which cannot be scheduled portable tools will be found of great value. This work must be done quickly and much of the work must be carried out in a manner that makes it impracticable to use machine tools. Hand labor predominates in this class of repairs and portable tools work in to greatest advantage.

Special Fixtures Assist in Keeping Machine Tools in Continual Use

MAINTENANCE men generally realize the value of modern methods for doing good work economically. These include carefully laid-out shops, improved facilities and up-to-date tools. They also include careful planning of the work for carrying it out on a previously arranged shopping schedule. Shop schedules properly developed and adhered to are an excellent means of disclosing weak spots in the shop operation and the machinery used. When the methods are not the best that can be developed with the tools available the schedule will lag; if new or more modern tools are needed this weak spot will be found.

A study of the shortcomings will show whether the present machine tool equipment is producing all that can be expected of it. If not, then perhaps the addition of some special fixtures and jigs will remedy the trouble. If the tools are producing all that they are capable of, then improved machines are needed.

Many improvements have been introduced in late types of machines, and new ways of performing machining operations have been brought out. Where a railway can obtain these new tools great economies will result, but where existing equipment must be used attention should be directed to increasing the efficiency of these as much as possible by employment of special fixtures and jigs. Except on large railway properties, electric railway shops will not be able to keep a particular machine tool in constant use on one class of work. To justify the investment in a modern machine it may be necessary to use it for jobs that might be done more economically on other machine tools if they were available. The efficiency of the machine for such work may be improved by fixtures that will reduce the time of setting up and make highly skilled labor less necessary.

From a check made to determine the machine tool equipment most used in electric railway repair shops, lathes were found to predominate. This condition was not unexpected, as lathes have always been considered a repair shop necessity, but the large number of special fixtures and jigs found for use with machining work on lathes indicated that they were being used for many operations usually considered as requiring other machine tool equipment.

It is common practice to bore many parts in lathes when boring mills are not available. Where both turning and boring are necessary on the same part, time and labor are frequently saved by performing both operations with a single set-up of the piece to be finished. Bearing work offers the most common example. There are few railway shops which do not have some form of self-centering chuck or special fixture for machining bearings.

Many out-of-the-ordinary jobs are done on lathes

by a careful study to provide ingenious jigs and other attachments so that the machine work can be done economically. Special fixtures and methods used for reboring motor shells and compressor cylinders on lathes were described in ELECTRIC RAILWAY JOURNAL for Feb. 24, 1923. Such pieces of equipment are too large to be turned in an ordinary lathe, and the work would probably be considered outside the range of this class of machine without careful thought and attention to the design of the fixtures needed. By clamping the large parts to the carriage and rotating the tools on a boring bar between the head and tail stocks the operation becomes quite simple and the work can be done economically and efficiently.

Shop practices of building up worn surfaces of parts by welding and remachining them are increasing. Many parts which otherwise would be scrapped can be reclaimed for further use by such methods, and much time and labor on machine work can be saved by using lathes to their best advantage. The many examples found where lathes are used with special fixtures for drilling, boring, reaming and milling machine work show that if necessary the usefulness of a lathe can be increased many times by analyzing the classes of work done in the repair shop and then by using the lathe wherever possible. This does not, of course, mean that the work can be done more expeditiously or at less cost than if a special tool were purchased. When the amount of work to be done is quite small the special tool is likely to be out of the question.

The Glory that Is Grand Rapids'

TWENTY-SEVEN modern street railway coaches were placed in regular service by the Grand Rapids Railway, Grand Rapids, Mich., last Sunday. It was a great event for Grand Rapids, but a greater event for the electric railway industry. These new vehicles represent modifications of the "Minnesota," "St. Louis" and "Ohio," model cars run for an experimental period. They are the last word in appointment. On that there is no need to dilate at this time. Their features have been laid before the readers of the JOURNAL before. There is, however, occasion to reiterate the change in attitude toward the transportation problem that the operation of the new cars reflects.

That is the broader aspect of the matter. Locally, the cars mean a great deal. So the Grand Rapids Railway was justified in going to unusual length in staging a parade and demonstration with which to introduce the cars. Here was a product of which the railway management could justly be proud. Here was the occasion for unusual advertising effort. The parade was excellent advertising—advertising in keeping with other progressive things this railway is doing. What could carry a more compelling message than the appearance in the line of march of cars of various vintages from 1880 to the present day? As a publicity idea this is not new, but the new coaches in Grand Rapids afforded a study in contrast never before achieved. In this respect the parade was new.

But that story is told in detail elsewhere in this issue. Only one phase of the new development remains to be enacted. That is the proposed funeral pyre to be made of the old equipment with the public as the invited guest of the railway. In the printed word and on the film the parade and funeral pyre will be broadcast over the land. Patrons of trolley lines all over the country will reflect upon the glory that is Grand Rapids'—a glory well deserved.

New Forms of Transportation Will Drive Railways Into Business

PERSONS who have been predicting the early demise of the railways, both steam and electric, due to the advent of road vehicles, will do well to ponder carefully the words of that veteran transportation man Samuel M. Vauclain, spoken before the American Railway Association at its Atlantic City convention last week. Far from causing the downfall of the railways, he holds that in the next ten years the bus and the truck will feed them a business so enormous that unless they increase their facilities very much they will be unable to handle it.

This view is so sound that it is difficult to see why it has not been accepted by every railway man, both steam and electric. As president of one of the great locomotive manufacturing companies, Mr. Vauclain is vitally interested in the growth of the railroad business. He refuses to be perturbed in the slightest degree. But he does point out that it is necessary not to find fault with the new things which appear as competitors, but to embrace them, enter into them and get the best out of them. That always has been and always will be the secret of progress.

Mr. Vauclain welcomes the automobile as a blessing to this country, because of the opportunity it gives the worker and his entire family to get an enlarged outlook on life. That in itself is one of the greatest blows to radicalism that could be struck. It must be remembered, however, that by the same token the demand of the worker has been increased, not only in wages but in standards of living. Transportation of the old sort is not sufficient. He is willing to pay the cost, whatever it is, for the sort of transportation he has educated himself up to. It is for the transportation man to measure up to this demand and furnish a service that will attract and satisfy the customer. The cost will take care of itself.

American Gears and Pinions Found Satisfactory in English Operation

RESULTS obtained with American gears and pinions as maintained in British shops indicate that they hold up well as compared with the British product, according to an article in this issue by A. E. Roberts. Likewise his story is a good message to American maintenance men as showing the value of the great care used to maintain bearings and accurate centers between gears and pinions. In this way the gears and pinions always mesh on the original pitch line.

British engineers have long maintained that it was necessary to manufacture gear and pinion teeth to very accurate dimensions. Mr. Roberts rather reluctantly admits that even though he is a Britisher he finds that the ten years experience with 356 American made gears on the Southern Railway of England has proved that despite the somewhat less accurate dimensions the American product has proved most satisfactory in service. The careful checking of gear and pinion centers every 100,000 miles insures good alignment and allows the surfaces to wear to accurate dimensions and to take on a very high polish along the pitch line.

Opportunity Lies Ahead in Local Transportation

At Second Sectional Conference in New York, Prominent Executives Point to Opportunities that Have Developed from Recent Difficulties—Broadened Vision and Increased Courage Needed to Grasp Significance of New Order of Things Brought About by Evolution in Transportation

THE local transportation industry has been satisfied too long with the crumbs. Out of past difficulties have grown broadened opportunities which call for expanding vision, a fresh viewpoint and increased courage. There has been no greater evolution in any phase of modern life than in transportation. But with the coming of the automobile has come a new public demand for rides, and by grasping the opportunity thus offered, the local transportation industry can be built up on a broader and sounder basis. In overcoming some of the difficulties of the past decade there will be reared a more comprehensive local transportation service than has been visualized in the past. Transportation men have been engrossed in the effort to cut the last possible penny from operating costs instead of bending their efforts to obtaining adequate revenues. A 10-cent base fare is more than justified. New and improved cars are essential. But all of these objectives require vision, initiative and courage.

FROM this will rise a new local transportation organization—not a street railway company but a local transportation agency with a street railway department. Easy-going, shiftless methods of the past must give way to a comprehensive approach to the new situation. Broad financial, franchise and organization problems lie ahead, but in the light of this new thinking there is the opportunity for recasting entirely the present status of transportation franchises and the popular conception of local transportation service.

Broadened View of Future Portrayed

This, in substance, is the view of the future portrayed by leading executives at the Second Advisory Council Sectional Conference held at the Engineering Societies Building, in New York, on June 10 and 11. "Appreciation of a new situation in business usually lags behind current development," said General Guy E. Tripp, chairman of the board of Westinghouse Electric & Manufacturing Company. "When business is confronted with an entirely new thing, it is usually either ignored or tacked on to current activity without an adequate appreciation of its significance. There has been no more fundamental evolution in any phase of modern life than in transportation. It is not surprising, therefore, that the coming of automotive transportation has not been accompanied by an adequate appreciation of the new era which is opening up."

Here General Tripp saw an opportunity for building a new local transportation structure out of which will grow a new service to people in modern communities. "Mere purchase and co-ordination of buses does not suffice," he declared. "The situation requires an adequate conception and acceptance of the new order. It affords the opportunity for arousing in the public mind an enthusiasm for such broadened service. From this will rise a new local transportation organization—not a street railway company but a local transportation agency with a street railway department. Easy-going, shiftless methods of the past must give way to a comprehensive approach to the new situation. Broad financial, franchise and organization problems lie ahead, but in the light of this new thinking there is the opportunity for recasting entirely the present status of transportation franchise and the popular conception of local transportation service."

"The electric railway industry needs courage," said W. F. Ham, president Washington Railway & Electric Company. "It has been too long satisfied with the crumbs. The time has passed for talking 6 or 7-cent fares or for following a penny-splitting policy toward revenue. A 10-cent base fare is more than justified, and electric railways should go after it. If this produces an excessive revenue in any particular situation, the slack may be taken out by various combinations of token fares under the base. At the present time, however, there are not many properties that need to worry about excessive earnings. Electric railway investors are not getting a fair return and they are entitled to a definite stand by managements for an adequate fare. Electric railways haven't spent the money to make their service attractive. They have been engrossed with economies and have given too little attention to obtaining adequate compensation which would enable improved service to be given. The industry needs new and attractive cars. Under the conditions which have existed for the past twenty years local transportation has been on far from a sound basis. The time has come for a new point of view and a courageous demand for conditions that will permit the development of local transportation service on a sound basis."

Thomas N. McCarter, president Public Service Company of New Jersey, said that although the in-

dustry is still surrounded with many pressing problems and difficulties, he could begin to see definite signs of improvement in basic conditions and that the future looked more hopeful than had been the case in 23 years.

Greater co-operation among electric railways and railway executives is needed for the improvement of basic conditions, according to Edward Dana, general manager Boston Elevated Railway. H. M. Addinsell of Harris, Forbes & Company, New York, declared that the investment banker can help little until improvement is made in the basic conditions surrounding the industry.

The policy followed by the Cleveland Railway for improving service was outlined by John Stanley, president. Although no new financing has been undertaken since 1907, there have been 500 new cars added to the service of the Cleveland Railways, and several extensions in track. Authority has recently been obtained from the City Council to scrap 100 cars that have become obsolete for service. To illustrate the importance of the street car in Cleveland, Mr. Stanley said that a recent poll of retail store patrons showed that 78 per cent had come by street car, 18 per cent by autos, and 4 per cent had walked.

"There has been too much apathy about their business among transportation men themselves," declared R. B. Stearns, vice-president and general manager Eastern Massachusetts Street Railway. Although there has been an improvement in the financial status of many railway properties, he pointed out, electric railway bonds on a good earning basis go begging.

"In the years just preceding the world war," said James H. McGraw, president McGraw-Hill Publishing Company, Inc., "the public began turning away from the electric railways. This was partly attributable to the fact that the railways failed to keep up with the times and began showing up in an unfavorable light. The rapid growth of the automobile merely intensified the situation. We can look back now and understand the developments which we were unable to understand then. Naturally railway securities were affected and the vicious cycle thus set up became cumulative.

Broader Vision Needed Now

"But, today, the public is gradually awakening to a new idea. Electric railway service is an essential which cannot be dispensed with and which is vital to the development of modern communities. At this point, railway managements need to recognize the new opportunity afforded them. First, the transportation machine must be put in order. The physical equipment must be made capable of rendering that character of service for which the American public is ready to pay.

"A broader vision and the courage necessary to carry it out are needed by the industry. The electric railway man has not learned adequately to use his local newspapers. Intensive cultivation and well directed advertising can make them a powerful, constructive force. New cars, new methods and a new viewpoint are the need of the hour."

Commenting on the subject of fares, Robert I. Todd, president and general manager Indianapolis Street Railway, said that experience with increases had shown that the volume of riding goes down as the fare goes up, but Joseph K. Choate, vice-president J. G. White Management Corporation, maintained that a 10-cent base fare gives less difficulty than do fractional intermediate fares. He indorsed the need for exercise of courage and vision in going after adequate revenues for local transportation service.

> ELECTRIC railways haven't spent the money to make their service attractive. They have been engrossed with economies and have given too little attention to obtaining adequate compensation which would enable improved service to be given. The industry needs new and attractive cars. Under the conditions which have existed for the past twenty years local transportation has been on far from a sound basis. The time has come for a new point of view and a courageous demand for conditions that will permit the development of local transportation service on a sound basis.

More Co-operation Needed

A plea for greater cohesion between the various elements in the industry and greater co-operation and accord in dealing with common problems was made by Lucius S. Storrs, managing director American Electric Railway Association. "Courage is needed in several directions," he said. "First, is the courage to approach the public with confidence in the justice of the railways' case. Combined with this is needed the courage to scrap old equipment that has become obsolete, to find ways of raising money for the acquirement of new cars, and to abandon unprofitable lines which in many instances were unjustified at their inception and have little economic value."

R. P. Stevens, president Penn-Ohio Edison Company, declared that electric railways have operating forces as efficient as those of any industry, but that the problem of the moment is largely a question of a state of mind. Once the industry itself thoroughly believes that it can be put on a profitable basis, a material improvement in present conditions will be effected. With re-established confidence, ways can be found for building riding and increasing fares to a point justified by the character of the service rendered. According to Mr. Stevens, the industry has failed to utilize adequately for the building of traffic the more than a million employees in street railway service.

Other speakers included B. C. Cobb, vice-president Hodenpyl, Hardy & Company, Inc., and chairman of the Advisory Council; G. A. Richardson, vice-president and general manager Chicago Surface Lines; A. C. Blinn, vice-president and general manager Northern Ohio Traction & Light Company; E. J. Dickson, vice-president United Electric Railways, Providence, R. I.;

T. A. Kenney, Hodenpyl, Hardy & Company, Inc.; J. K. Punderford, president and general manager the Connecticut Company, and Leslie Vickers, economist American Electric Railway Association. In a discussion of some of the fundamentals of electric railway economics, Mr. Vickers pointed out that taxes collected from street car fares are discriminatory in that street car riders are largely wage earners and consequently least able to pay this indirect form of taxation. Railway managements have not adequately utilized the popular appeal of this condition in discussing the general subject of excessive local transportation taxes.

Copper Used in Electrification of C., M. & St. P. Railway

The Amount of Copper per Mile Used in This Electrification Shows the Important Part Which This Metal Bears in Any Electrification Undertaking

By R. Beeuwkes
Electrical Engineer Chicago, Milwaukee & St. Paul Railway, Seattle, Wash.

ELECTRIFICATION of the Chicago, Milwaukee & St. Paul Railway extends from Harlowton, Mont., to Avery, Idaho, a distance of 438 route-miles, and from Othello to Tacoma, a distance of 209 route-miles. All power is purchased and is delivered to the railway's 100,000-volt transmission system at certain substation locations. The transmission system in Montana and Idaho is 364 miles long, and the transmission conductors each consist of a No. 00 B. & S. gage, six-strand copper cable. The transmission system between Othello and Tacoma is 186 miles long, including 138 miles of No. 00 B. & S. copper cable similar to that used for the section between Harlowton and Avery, and 48 miles of No. 0 B. & S., six-strand copper cable. Between Harlowton and Avery this transmission line serves fourteen substations, and between Othello and Tacoma eight substations, and in each of these stations there are installed transformers and motor-generators by means of which the current received from the transmission system is transformed to 3,000-volt direct current for use on the trolley system.

The trolley system consists of the trolley wires, contact with which is made by the collecting pantograph on the locomotive, and of the feeder system to which the trolley wires are connected at suitable intervals. The trolley wires over the main track consist of two No. 0000 B. & S. grooved copper trolley wires, hung side by side, and on side tracks of a single No. 0000 B. & S. grooved copper trolley wire. The feeder system consists of one or more 500,000-circ.mil or 750,000-circ.mil copper cables.

In addition to the copper which is used for the four main electrification facilities as herein described, there is also used a very considerable amount for the wires or alternating-current signal system. These wires are mounted on the same poles as those carrying the trolley and feeder wires, and consist of two No. 4 B. & S. copper. These wires furnish current to transformers, relays, track, impedance bonds, and other signaling apparatus, which also contain a considerable amount of copper of which no direct figures are available.

There is also mounted on the trolley poles a so-called power indicating and limiting circuit, consisting of two No. 8 B. & S. wires, which extend practically the entire length of the electrification and which are for the purpose of energizing certain apparatus which has for its purpose the regulation of maximum power demand used by the railway.

The following tabulation has been prepared to show the amounts of copper used in the different facilities involved in the C., M. & St. P. electrification systems:

ELECTRIFICATION—HARLOWTON, MONT., TO AVERY, IDAHO		
Miles main line electrified	437.6	
Miles yards and sidings electrified	141.9	579.5
Miles transmission line		363.6
Substation Apparatus	Pounds	Pounds
Motor-generator sets	400,000	
Transformers	288,000	
Switchboards	48,000	736,000
Locomotives		
10 passenger	274,900	
26 freight	768,300	
3 switching	22,800	1,066,000
Transmission System		
No. 00 conductor		2,382,000
Trolley System		
Trolley wire	3,478,000	
Feeder wires	5,841,000	
Rail bonds	598,000	9,917,000
Signal System		
Primary circuit	599,000	
Secondary circuit	43,000	642,000
P. I. & L. Circuit		
Pilot wire		221,000
Total—Rocky Mountain and Missoula Divisions		14,964,000
ELECTRIFICATION—OTHELLO TO TACOMA, WASH.		
Miles main line electrified	211.1	
Miles yards and sidings electrified	69.8	280.9
Miles transmission line		185.9
Substation Apparatus	Pounds	Pounds
Motor-generator sets	234,000	
Switchboards and transformers	127,000	361,000
Locomotives		
5 passenger	336,000	
16 freight	472,500	
1 switcher	7,500	816,000
Transmission System		
No. 00 conductor	906,000	
No. 0 conductor	252,000	1,158,000
Trolley System		
Trolley wire	1,699,000	
Feeder wires	2,926,000	
Rail bonds	350,000	4,975,000
Signal System		
Primary circuit	281,000	
Secondary circuit	21,000	302,000
P. I. & L. Circuit		
Pilot wire		106,000
Total—Coast division		7,718,000
Grand total, Rocky Mountain, Missoula, Coast Division		22,682,00

From the accompanying table it will be noted that the electrification of the 438 miles between Harlowton and Avery involves a total use of copper per mile of approximately 17 tons, and between Othello and Tacoma of about 18¼ tons, or an average of the whole territory per mile of about 17.4 tons, not including a comparatively small amount of copper used for various minor miscellaneous purposes such as lighting circuits in substations, etc., and, as previously noted, for certain portions of the signal system.

The amount of copper used for the different facilities will, of course, vary with the traffic and other conditions that have to be considered in a particular case, but the amounts given in the table as used in the C., M. & St. P. Railway electrification are amply sufficient to allow for future normal expansion of business.

These figures, it is believed, will demonstrate better than any other way the importance of the metal copper in connection with railway electrification work.



Skokie Valley Line of the Chicago, North Shore & Milwaukee Railroad Joins and Crosses the Libertyville Branch at a Wye at South Upton Junction

This section of four-track right-of-way suggests the ultimate appearance of the line into Chicago, as provision has been made eventually to have four tracks for the entire route. Overhead wires that control cables for the interlocking plant are carried on steel bridges. On the double-track portions single bridges are used.

Skokie Valley Route Gives North Shore Line Widened Territory and Improved Facilities

Ten Million Dollar High-Speed Cutoff of the Chicago, North Shore & Milwaukee Railroad Represents Economical Combination of Railroad and Power Line Right-of-Way, Catenary Overhead Construction, Full Automatic Substations with Supervisory Control, Modern All-Electric Interlocking Plants and High-Speed Roadbed Provided on 22½-Mile New Route



New Skokie Valley Route of the North Shore Line Is from 2 to 4 Miles West of the Original Shore Line

This line leaves the older line at Howard Street, traverses the Niles Center branch to Dempster Street, from which point it runs directly north to the Libertyville branch, and thence east a short distance to join the main line along the North Shore at a point just north of North Chicago. Nine stations have been located along the line for local passenger service. However, at present the line is used for the high-speed Chicago-Milwaukee trains and for freight service. Ultimately, it will be a four-track road from the Chicago "Loop" to Milwaukee city limits. The new route will allow for a running time between Chicago and Milwaukee of one hour 58 minutes, which is eighteen minutes faster than the fastest train on the Shore Line.

DUPLICATE rights-of-way between Chicago and Waukegan are possessed by the Chicago, North Shore & Milwaukee Railroad since the completion of the Skokie Valley line. The old line through the cities and suburbs along the lake is now called the Shore Route, while the new route, some 2 to 5 miles west, is called the Skokie Valley Route from the name of the stream which traverses this valley. This new line represents the most modern practices in high-speed trunk line railroad construction. Its location furnishes a right-of-way with low grades and eliminates the necessity of complicated construction work. In this respect, it is in contrast to the Niles Center division, where many difficult forms of railroad construction were necessitated by the topography and the obstacles encountered.

The new Skokie Valley Route is a continuation of the Niles Center branch, leaving this line approximately ½ mile south of the Dempster Street terminal. It continues north for a distance of 22½ miles to join the old main line of the Chicago, North Shore & Milwaukee Railroad at a point just north of North Chicago.

Economic Value of Location

Two outstanding points mark the new Skokie Valley route as a practical bit of railroad location and engineering. These are, first, the economic features of its location and, second, the intensive use made of the right-of-way. The line extends along the west side of the Skokie Valley, in the territory between the solidly built-up communities along the lake shore on the east and the towns already established along the Chicago, Milwaukee & St. Paul Railway on the west. The territory is near enough to Chicago so that it is expected that a large commutation business will be built up through the construction of this line. At the same time the road is admirably located to provide freight service for handling materials which will be shipped in for improvements in the territory.

The line traverses a territory through which high-speed operation is possible. This enables the Chicago-Milwaukee limited service to be operated at a speed which reduces the running time between these two towns by approximately eighteen minutes. It also permits high-speed service between Chicago and Libertyville and Mundelein, communities which are developing rapidly. Of course, as the communities along the line grow, conditions probably will change and it will be necessary to meet such conditions by grade separations and other improvements. When that time arrives, how-

ever, the business of the road no doubt will have grown to the point where this will be justified.

Joint use is made of the right-of-way by the North Shore Line and the Public Service Company of Northern Illinois. The ultimate plan calls for two lines of transmission towers together with supplementary lines of lower voltage, which on account of clearances required because of high voltage make necessary a right-of-way of 135 ft. On account of the spacing of the transmission lines with respect to each other and the adjoining land, it was found possible to locate on the same right-of-way a four-track railroad system. Such a right-of-way, if used alone for railway purposes, would have been at least 100 ft. wide. Thus the use of the 135-ft. right-of-way jointly has resulted in a saving of a 100-ft. strip or approximately 12 acres per mile. Taking into consideration the value of property through that territory, this saving has been considerable. Items common to the two utilities, such as fencing, drainage, and other miscellaneous details, have also been greatly reduced.

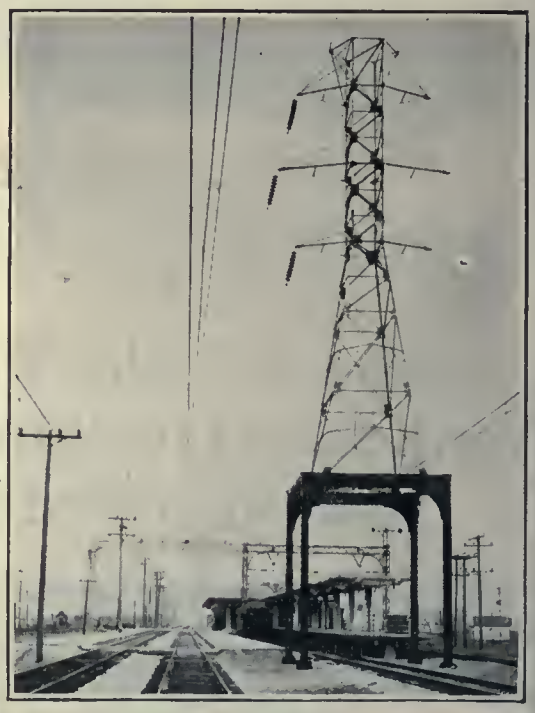
In regard to the construction of the line, the same policy has been followed as was done in the case of the Niles Center section. Everything has been carried out in a permanent manner with the exception of the rails, which through the greater portion of the line are 80-lb. relayer steel installed to meet the conditions due to settlement for the first two or three years after construction.

The design meets all requirements for a high-speed line, connecting the city limits of Chicago and Waukegan without traversing the densely populated suburbs along the lake shore. In view of all of the things that would have had to be done to the Shore Line route to make it comparable with the new Skokie Valley Route, the expenditure of $10,000,000 is a very economical investment. Grade separation on the old Shore Line to make it possible to increase facilities through the various towns would have entailed prohibitive expense. In order to increase the capacity of the original line between Chicago and Milwaukee, to meet the needs of the constantly growing traffic, the most economical solution of the problem was to construct a line on an independent right-of-way near enough to the existing right-of-way to provide for the proper connections between the two lines. Such a location was found in the Skokie Valley, where the new line has been constructed.

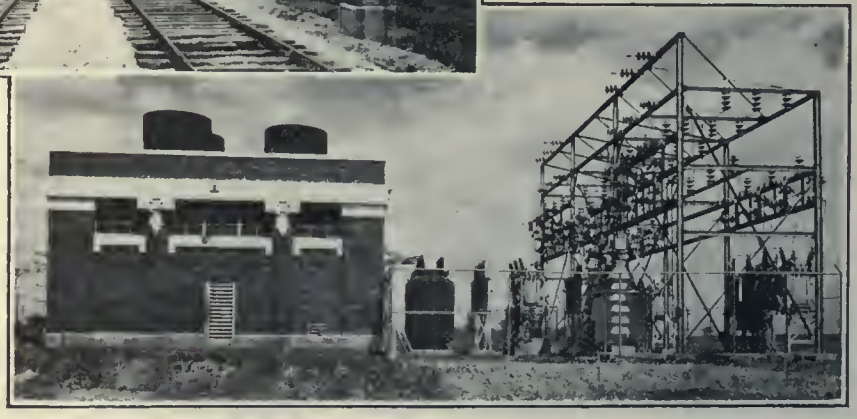
Substantial Line Equipment Is Used on the New Skokie Valley Route

Overhead supporting bridges are of the double expanded steel truss type carrying the catenary messenger on top, which in turn supports the secondary and contact wires. The high-tension tower is used as one supporting leg of alternate bridges. As these towers are 500 ft. apart the catenary supporting bridges in this particular vicinity are spaced at 250 ft. centers.





Power is furnished by five automatic supervisory controlled substations. Four of these are 1,500-kw. rotary converter stations, while the fifth is a 1,000-kw. mercury arc rectifier installation. All stations are of the semi-outdoor type similar to the one shown. High-tension taps are taken from the Public Service 33,000-volt, 60-cycle line which parallels the railroad. No feeder cable is used on the distribution side of the substation the catenary construction providing a conductivity equivalent of 1,200,000 circ.mils per track. These stations are 3¼ miles apart.



Dempster Street Station, used as the terminal of the Chicago Rapid Transit line, showing the island platform for the rapid transit trains and also the grade platform for the North Shore Line trains.

ROADBED BUILT AT LOW GRADES

Construction of the roadbed provided a right-of-way at low grade. Very few cuts were necessary, although considerable fill work was required at low points in the valley. Material for these fills was obtained from a borrow pit on purchased land. This pit will be made



One of the Nine New Combined Stations and Agents' Residences, Which Are of Spanish Design

This station consists of waiting room and house for the agent, who acts as representative of the company in maintaining and protecting its property. The building is of permanent construction and may be used as a home after the waiting room facilities have been outgrown by moving it from its present site onto adjacent property. This station cost about $9,500 to build.

into an attractive lake of credit to the neighborhood. From this land approximately 550,000 cu.yd. of fill was obtained. The only extra cost in getting this material was in the construction of a dam for impounding the water and a concrete spillway in this dam. A lake of 43 acres area and a maximum depth of 12 ft. was excavated.

On top of this right-of-way are laid two tracks carried on creosoted red oak ties. Ultimate standard construction of the track will utilize 100-lb. A.R.A. rail supported on tie plates. Because of the eventual settling of the roadbed the present construction is of 80-lb. relayer rail. All curves are for high-speed operation with super-elevation, which permits an operating speed of 70 m.p.h. The grades do not exceed 0.5 per cent, which permits economical freight operation as well as high-speed passenger train service.

The total length of construction amounted to 46 track-miles. Of this amount 42 track-miles is in new construction on the Skokie Valley division and the remaining 4 miles is additional trackage on the Libertyville branch. In addition to this new work the entire Libertyville branch line was rehabilitated for high-speed traffic.

A feature of the construction is the elimination of curves at the crossing of the Lake Bluff cut-off of the Chicago & North Western Railway. Here a change of 4,600 lineal feet of track of the Chicago & North Western Railway was necessary in order that the electric line and the steam line would cross on tangent tracks. However, the crossing is made at such an angle as to necessitate the use of movable crossing frogs. While this adds to the mechanism of the interlocking plant, it insures an exceptionally smooth crossing for speeds of 45 and 50 m.p.h., which are permissible through this particular plant. Similar changes were made in the alignment of the Libertyville branch in order that the crossing of this branch and the main line to Milwaukee would be on tangent tracks.



Where the New Skokie Valley Line Parallels the Old Libertyville Branch Line. The Overhead Bridges Span Four Tracks and in Some Cases Have a Length of 99 Ft.

All streams are crossed by means of creosoted timber bridges. This construction was considered economical in view of the fact that before the life of the bridge expires conditions in this section of the country may have changed to such an extent that the creeks and streams will either be eliminated or will be reduced in size to permit the use of a culvert where now a bridge is necessary.

In connection with the construction of trestles, it was found advantageous to divert the channel of the Skokie Creek so as to place it entirely on one side of the right-of-way. This eliminated a number of crossings which would have entailed considerable expense, inasmuch as this particular waterway has been deepened and widened by order of the government. The diversion work amounted to 4,000 lineal feet and necessitated 17,000 cu.yd. of excavation and the construction of 3,000 sq.yd. of rip-rap wall.

Summarizing the amount of construction work, it is found that the total trackage in the valley line construction, including the rearrangement and alignment of branch and auxiliary lines, and the Chicago & North Western Railway, amounted to 57 track-miles requiring 601,000 lineal feet of rail weighing 8,080 tons. The total amount of ballast used on this trackage, including cinders on the branch line auxiliary and temporary track, was 4,886 carloads. This trackage is carried on 165,275 crossties, which is the equivalent of 3,700 carloads.

Stations Are of Artistic Design

Beauty and utility have been combined in the design and construction of the nine stations along the route. These follow very closely the Spanish type of architecture. Inasmuch as the adjoining country is at the present time but sparsely settled, it was thought desirable to have a representative of the company live at each of the stations in order to maintain and protect the property. The agent at each station has a modern dwelling that has been built in connection with the station. The room adjacent to the loading platform is the station proper. Back of this is a modern five-room house containing all modern facilities and conveniences for living quarters. A dining room, living room, kitchen and two bedrooms and bath form a very attractive home for the agent.

Even in the construction of these houses, which represent an expenditure of $9,500 each, consideration was given to economy. When the station facilities have been outgrown and it is necessary to erect a large building devoted exclusively to that purpose, the house may be moved to adjoining property and serve as a home. At the present time it serves as a stimulus to those purchasing property in the immediate vicinity to pattern homes after it, not so much in the style of architecture, but in high-class design and construction. Property along the route has risen in value to such an extent that it is almost assured that high-class, expensive homes will be built in the vicinity.

Automatic Substations Include One Mercury Arc Rectifier

Power is furnished to the catenary trolley by five new substations built along the right-of-way. In addition, the new line is tied in with three substations supplying the Shore Line, the Niles Center division and the Libertyville branch. They are 3¼ miles apart and are full automatic in operation. Four of these stations contain 1,500-kw. rotary converter units and one a 1,000-kw. mercury arc rectifier. The stations are of the semi-outdoor type and are all equipped with General Electric Company selector-type supervisory control. The substation design is in keeping with the artistic buildings erected along the right-of-way by the North Shore Line and conform with the latest practices in such construction.

Due to the fact that the right-of-way parallels a high-extension line of the Public Service Company of Northern Illinois, it was unnecessary to erect such a line for the railway. Taps at all stations cut in on the 33,000-volt 60-cycle line of the power company, thereby furnishing the necessary energy for the operation of the stations. The high tension is all handled outdoors in an inclosed yard to the rear of the station building.

Distribution of the 600-volt direct current is made directly to the overhead catenary constructed trolleys. No feeder copper is used, the overhead construction being of sufficient conductivity to maintain the proper operating voltage. The catenary consists of a primary copper messenger 1.047 in. in diameter having a brass core. It has a tensile strength of 39,000 lb. Below this is suspended the secondary, consisting of a 300,000-circ.mil copper cable. The contact wire is grooved No. 0000 wire having a 65 per cent conductivity. The combined conductivity per track amounts to 1,200,000 circ.mil.

This overhead construction is supported by means of bridges, some placed at 250 ft. centers and others at 300 ft. centers. The 250 ft. spacing of the bridges was caused by the use of a high-tension power line tower as one supporting leg for each alternate bridge where the railway parallels the power line. However, where the right-of-way leaves the power line, the overhead bridges are spaced 300 ft. The trolley bridges are constructed of Bates double expanded steel. The two uprights and the horizontal member are identical in construction, being joined by heavy gusset plates and bracing. The messenger is supported by an insulator mounted on the top of the bridge. Every 4,600 ft. there is an anchor bridge where the messenger is permanently anchored. This bridge will support the entire overhead construction from that point if messengers should break on one side. The weight per foot of this construction is approximately 4¼ lb.

One of the interesting pieces of construction work in connection with the overhead catenary was the suspension on 4 deg., 7 deg. and 11 deg. curves. On both the 4 and 7 deg. curves the overhead was erected with displaced messenger without pull-offs. In some places on these curves the messenger had a displacement of as much as 106 in. An accompanying illustration shows an example of this special work. On these curves the supporting bridges were especially designed to withstand the side strain.

Track Well Bonded

All track is bonded with 400,000-circ.mil Una bonds which are of the copper arc-weld type. Crossovers and special work are bonded through with copper arc-weld bonds, using long cables to which were welded pigtail bonds. The interlocking plants being controlled by alternating-current track circuits required the installation of heavy impedance bonds at the ends of such circuits.

In addition to the power facilities, the electrical department also installed a 30-pair telephone cable along the entire right-of-way. Telephones were installed in all passenger stations, substations, towers and in a booth at each crossover.

Interlocking Plants Are of Modern Construction

Three modern interlocking plants constitute part of the equipment of the line. The one at Dempster Street at the junction of the new line and the Chicago Rapid Transit terminal is mechanical in operation. The second, 16 miles north of this, is at Skokie Junction. Here the Lake Bluff cut-off of the Chicago & North Western Railway crosses at grade. The third and largest of the plants is at South Upton, where the new line crosses the Libertyville branch, and this branch in turn crosses the main line of the Chicago & North Western Railway. It is at this point that a "Y" was constructed to facilitate the movement of trains in several directions. The plants at Skokie Junction and South Upton are all-electric in operation and are of the latest type of the Union Switch & Signal Company.

At Dempster Street the Chicago Rapid Transit Company, which leases trackage rights over the Niles Center division, has a terminal station with two stub-end tracks alongside an island platform. The new tracks leave the tracks used by the Chicago Rapid Transit Company at a point approximately ¼ mile south of the terminal. Here a manually-operated interlocking plant was installed. The plant consists of a 24-lever machine controlling the diamond crossover for the Chicago Rapid Transit trains and the leads between the C.R.T. tracks and the North Shore tracks. Dwarf signals indicate line-ups both with and against traffic. This plant allows for the by-passing of the station of North Shore Line trains and is in continuous operation during the 24 hours of the day.

At Skokie Junction the Lake Bluff cut-off of the Chicago & North Western Railway crosses the North Shore Line right-of-way and joins the main line of the Chicago & North Western Railway within the jurisdiction of this plant. The steam railroad formerly had a mechanical plant to handle the movement through its junction. This was replaced with an all-electric plant having 26 working levers on a 31-lever frame. This machine handles both the junction and the North Shore crossing. At this particularly high-speed crossing movable point frogs are used. This necessitated the use of more switch machines than would be necessary with fixed-point equipment. The entire plant is controlled by a.c. track circuits divided into annunciator, home and distant signal circuits. On the steam railroad semaphore signals are used, as this is standard practice on this property. However, on the North Shore Line two-position color light signals are used. Derails protect all line-ups, either with or against traffic. The North Shore Line built the artistic and attractive tower at this location. It is operated jointly with the Chicago & North Western Railway in 24-hour service.

A feature of this plant is its safety in operation. The lever man must put the home signal to normal while the train is in the home block a distance of 500 ft. If this is not done, the machine is automatically locked against further manipulation until a time release allows for further changes in line-up. This time release, which in this particular case is set at two minutes, must be operated to return the home signal to normal if the towerman fails to take the route away while the train is in the circuit. In this installation, the annunciator signal is 4,000 ft. in advance of the distant signal, which in turn is 4,000 ft. ahead of the home signal.

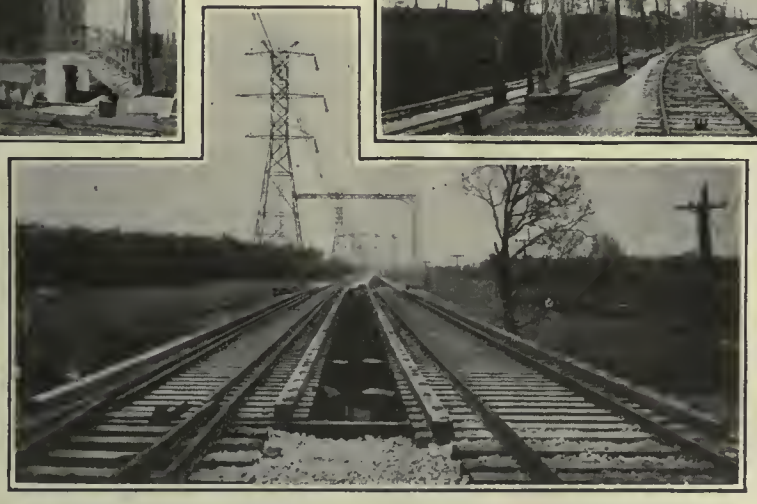
In the interlocking plant installations all wires with the exception of those to the track machines are carried in a marlin-laced cable, carried on messenger, supported



Above is a typical interlocking tower built by the North Shore Line at Skokie Junction and at South Upton. These conform in design and construction with the North Shore standard practice.



On curves of small radius, the overhead construction is carried by displaced catenary without pull-offs. In this particular instance, on a 7 deg. curve, the catenary is displaced 106 in.



Creosoted timber bridges are used to span all streams and highways. This construction has the economic advantage of a small investment, allowing for the bridge location to be changed as conditions in the territory change. The life of these bridges is figured at 25 years, at the end of which time changes may be such as to justify the installation of permanent concrete or steel structures.

by the trolley wire catenary bridges. Power for the operation of the plant is furnished by a motor-generator set in connection with a battery. This arrangement is of the standard 110-volt d.c. type with 12-volt a.c. track circuit.

South Upton Junction plant is the largest and provides for the greatest number of train movements and line-ups. This type "F" electric interlocking machine has 50 working levers in a 55-lever frame. Twenty working levers are for 32 signals and 30 for four single switches, two single slips, and 22 derails. The frame has two rows of lever lights equipped with 6-8-volt bulbs. The magnets operate on 110-volt d.c. On the wall above the machine is an illuminated track model of the spot-light type. This model has 26 painted sections with 60 lamps, 50 of which are white, eight red and two green. A similar type of track model is also in the Skokie Junction tower.

At Upton Junction it is possible to route trains in a number of directions. Traffic north from Chicago may be sent either to Milwaukee or to Libertyville. From Milwaukee, trains may be directed to Libertyville or Chicago. From Libertyville, three line-ups are possible —to Lake Bluff on the branch, or to Milwaukee or Chicago on the main line. However, trains from Lake Bluff can only be sent straight through the plant to Libertyville. In addition to these switching operations on the North Shore Line, the plant also controls the two-track crossing of the main line of the Chicago & North Western Railway. The plant, equipment and operation, is identical with the Skokie Junction plant. It is all-electric with semaphores used on the steam line and two-position color lights on the electric line.

New Cars Arrive in Time for Opening

Additional rolling stock in the form of 20 new cars of the standard type have been received by the Chicago, North Shore & Milwaukee Railroad for use in limited service between Chicago and Milwaukee. These have arched roofs, smoking compartments, toilet facilities, and are of steel construction, carried on high-speed trucks. Four 140-hp. motors are geared to give a free running speed of 72 m.p.h. This is approximately 7 miles per hour faster than the former equipment of the North Shore Line. The cars are equipped with poles having a trolley shoe through which contact is made with the catenary constructed overhead. Third-rail trolley shoes are also provided in order to allow the equipment to be run over the tracks of the Chicago Rapid Transit Company.

The interior of the car is finished in mahogany. The main compartment is equipped with interurban high-back seats, upholstered in green figured mohair. The smoking compartment has the same type of seat, covered with black leather. The weight of the car is approximately 100,000 lb.

Maintenance Costs Reduced in Fort Worth

Better Inspection and Use of Trolley Shoes and Regular Inspection of Trolley Wire and Supports Are Also Responsible for Fewer Failures in Overhead Construction

CONTINUED use of the sliding contact shoe in Fort Worth on both city and interurban cars instead of trolley wheels has effected important reductions in the cost of maintaining the current-collecting equipment on the cars, and the contact wire itself.

Trolley wire breaks on the 163 miles of city and interurban tracks of the Northern Texas Traction System have been reduced from the peak of 350 in 1921 to 23 trolley breaks for the entire year of 1925. Credit for this reduction is not entirely due to the current-collecting devices but to the rigid and regular inspection of overhead systems and the repair of badly worn places before a break occurs. A description of the early work done in Fort Worth in investigating the current-collecting troubles is given in the issue of ELECTRIC RAILWAY JOURNAL for May 17, 1924, page 767.

TABLE I—COMPARATIVE COSTS OF TROLLEY WHEELS AND SLIDES PER 1,000 CAR-MILES

	1919	1920	1921	1922	1923	1924	1925
City Division							
Trolley wheels..	$0.324	$0.236	$0.449	$0.306	.....	.....	.....
Trolley slides...	.....	.....	.....	$0.228	$0.237	$0.239	$0.153
Interurban Division							
Trolley wheels..	$0.312	$0.615	$0.896	.....	.....	.....	.....
Trolley slides...	.....	.....	1.639	$1.070	$0.709	$0.507	$0.151

Accurate costs of operation have been kept since 1919 to date. Up to 1921 both the city and interurban divisions were operating with trolley wheels. During 1921 the interurban division had installed a number of Miller trolley shoes. In 1922 this replacement was completed and the city division was changed over. Since the beginning of 1923 all cars have been equipped with Miller shoes.

As will be noted from the individual tables and charts, the cost of trolley slides has been reduced on both the city and interurban divisions so that it is now costing a trifle more than 15 cents per 1,000 car-miles on both divisions. Turning to the total cost of material used in maintaining the current-collecting equipment, including the collecting equipment on the cars, the ears,

TABLE II—DETAIL COST BY YEARS OF MATERIAL USED FOR MAINTAINING CURRENT-COLLECTING EQUIPMENT AND OVERHEAD CONSTRUCTION, EXCLUDING POLES, FEEDERS AND SUPPORTS

	1919	1920	1921	1922	1923	1924	1925
City and Interurban							
Current-collecting equipment	$6,723.01	$6,735.27	$6,545.27	$5,408.50	$4,107.31	$3,529.90	$980.89
Ears, sleeves, etc.	2,470.86	5,690.83	3,298.65	2,301.23	2,504.26	2,472.00	2,289.92
Trolley wire	14,182.77	16,748.64	13,983.93	6,264.67	3,654.54	3,680.54	1,877.19
Total	$23,376.64	$29,174.74	$23,827.85	$13,974.40	$10,266.11	$9,682.44	$5,088.00

TABLE III—RECORD OF TROLLEY BREAKS AND COST OF REPAIRS

	1919	1920	1921	1922	1923	1924	1925
Number of trolley breaks	.....	260	350	191	80	49	23
Total car-miles	8,229,243	9,044,829	8,782,208	8,422,863	8,485,715	8,671,596	8,740,396
Cost per 1,000 car-miles	2.84	3.23	2.72	1.66	1.21	1.12	0.58

sleeves, etc., of the overhead construction, and the trolley wire, it is noted that the total cost for the property has been reduced from the high point of $29,175 in 1920 to $5,088 in 1925.

The contact wire is greased on a systematic basis once every 90 days in outlying sections and every 60 days in the downtown sections under which are operated the greatest number of car movements. When new wire is strung it is immediately greased. Experience has shown that the cost of greasing trolley wire has been $0.959 per mile of wire on the city division and $1.25 per mile on the interurban division.

Trolley slides are rebuilt on a mileage basis. Formerly, the shoes were allowed to wear down to a certain predetermined depth and were then rebuilt. The shoe now comes down at every overhauling and is rebuilt by welding new material on the worn section. The welded runner is ground to shape and made smooth. The cost for rebuilding shoes averages 16 cents each.

Results obtained during the early trial period from part wheel and part slide operation over the same wire were not good. The wheel formed pits on the wire that increases the wear on both wires and slides. When slides are used on all cars they soon wear down these pits and smooth operation is obtained.

Another noteworthy result is the reduction of noise in the car because the sliding contact avoids the drumming action on the car roof.

Some trouble has been experienced on some roads due to backing up operation. In Fort Worth the one-man operated cars are never backed up without first reversing trolleys. When necessary, interurbans are backed up slowly in a satisfactory manner, with the conductor holding the trolley rope. With the small amount of reverse operation required on the property little difficulty has been experienced from this source.

Insurance Labels for Cars

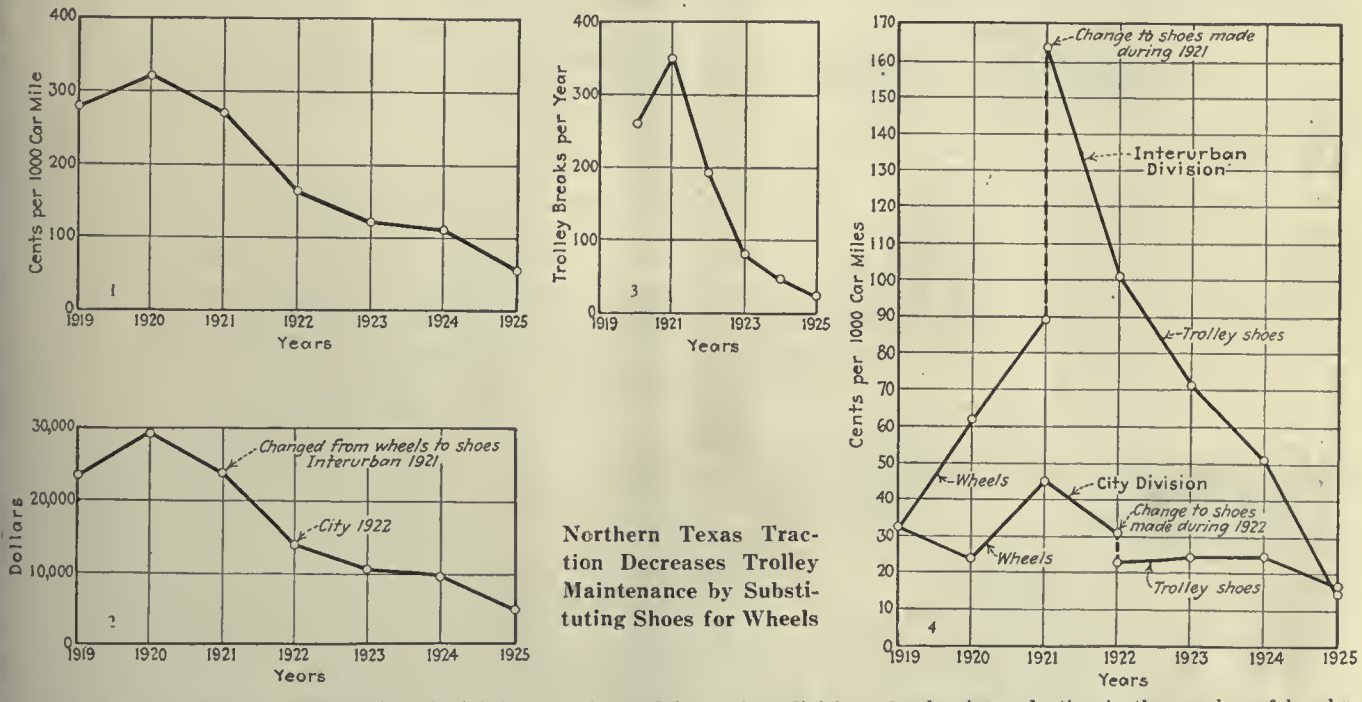
Now Available to Indicate Complete Conformity to Underwriters' Standards—Cars So Labeled Will Have the Benefit of Lower Insurance Rates

THOSE who have not been following fire insurance regulations closely within the last year may not realize that standard labels are now available for complete cars that have been built and equipped under the regulations of the National Board of Fire Underwriters. It is only within the last few months that any cars actually have been so labeled and so have the benefit of the maximum reduction in insurance premium.

The result mentioned is the outcome of some fifteen years of hard work by the insurance companies and the insurance and maintenance departments of the railways. During the history of the movement several committees representing each of these interests have worked individually and together, and their activities finally brought about the 1925 regulations of the National Board of Fire Underwriters for electric railway carhouses and cars.

After the formal acceptance of these regulations by the National Fire Protection Association and the American Electric Railway Association, the question was raised whether the labels of the Underwriters' Laboratories, Inc., would not now be available for complete cars. The fire insurance rating authorities agreed to permit this on all cars whose wiring fulfilled the specifications, and whose equipment, such as wire, switches, fuses and lamp receptacles, was of an approved listed type, and whose heaters had individual labels. The ruling did not require the label for the heavy equipment, such as the controllers, grid resistance and motors.

The first cars to be thus labeled were some recently



Northern Texas Traction Decreases Trolley Maintenance by Substituting Shoes for Wheels

Curve No. 1—Graphical representation of cost per 1,000 car-miles of trolley breaks on the entire system, showing reduction in cost of repairing trolley wire made possible by the use of sliding shoes instead of trolley wheels. Substitution was made during the years 1921 and 1922.

Curve No. 2—Cost of maintenance material for the city and interurban division of the Northern Texas Traction Company showing the saving effected by the use of Miller sliding shoes on both city and interurban divisions.

Curve No. 3—Number of trolley breaks per year on the 163 miles of wire operated by the Northern Texas Traction Company, showing reduction in the number of breaks caused by the use of sliding shoes substituted in 1921 and 1922.

Curve No. 4—Cost of trolley wheels and Miller shoes per 1,000 car-miles. Note the reduction after the substitution. Worn shoes are now rebuilt every time the car comes in for overhauling.

ordered by the Georgia Railway & Power Company for its Atlanta system. They were inspected in part at the shops of the Cincinnati Car Company, where they were being built, and in part in the carhouses at Atlanta. In this case the heaters were tested as installed because the specifications for the cars were drawn before the institution of the label service on completed car heaters, but in future cars the heaters as well as the rest of the equipment will have to bear the Underwriters' label to secure the complete car label. Obviously, it will not be possible to inspect old cars for labels unless the concealed wiring is uncovered, so that it may be viewed by the inspectors having jurisdiction.

Eventually, it is expected, a considerable credit in the fire insurance rate will apply on cars bearing this label, as the insurance interests will accept only the labels of the Underwriters' Laboratories as evidence of standard wiring and heater installations.

Cars Remodeled on Central London Railway

WHEN the Central London Railway, running from the heart of the city to the western outskirts, was opened for traffic in July, 1900, the cars were regarded as sumptuous, but they were all trail cars, electric locomotives being used to haul them. In consequence of complaints of vibration from the tenants of houses above the route, though the railway is at a great depth, the heavy locomotives were superseded by multiple-unit trains. The complaints then disappeared, but in recent times the call has come for improving the cars. A result now is that 250 cars are to be remodeled and refitted throughout to provide the same standards of comfort and efficiency as are now afforded on the Hampstead and City lines. The improvements include more comfortable seats, pneumatically controlled doors, better lights, better ventilation and faster running.

One car has been rebuilt on these lines and the results of a trial run in service have been so satisfactory that the "Underground" will proceed at once to remodel all the rolling stock on the line.

The manually operated gates at the ends of the cars have been removed and the platforms completely inclosed. Passengers step immediately into the compartment instead of having to make a right-angle turn as at present. Entrance and exit are effected through air-operated doors, four being provided to each car. These are spaced equidistantly. Passengers are near to an exit wherever they may be seated and a more uniform loading of the car is the result. Control of these doors can be achieved from any part of the train. On a seven-car train the rear guard controls the doors in the rear part and the front guard the remainder. The safety devices on the air doors provide that during the last 6 in. of stroke of the door engine the pressure is retarded almost to zero so that the door can be easily pushed back by hand. The door edges, further, are cushioned with broad rubber tubing. An ingenious electrical interlocking device secures that the starting signal cannot be given until all doors are closed.

The lighting has been materially improved and is more evenly distributed. A new type of lamp bracket is employed and all lamps are shaded. More ventilators are fitted and a new and simple type of drop window, which can be regulated by passengers, affords still better ventilation. Well sprung seats upholstered in moquette replace the old seats of pegamoid, rattan and wood. The interior decoration is in green and mahogany, giving the car a bright, cheerful appearance. The exteriors of the cars are painted red and cream.

The improved rolling stock will be capable of high speeds. Experience gained with cars of similar type on the Hampstead and City lines shows that at busy points the station stopping times have been reduced from 50 seconds to 25 seconds. On the Central London tube this will mean a saving of considerable time in the through journey. Instead of four motors on the six and seven car trains there will be six motors. This increase will give better acceleration and it is estimated that at least four minutes will be saved.

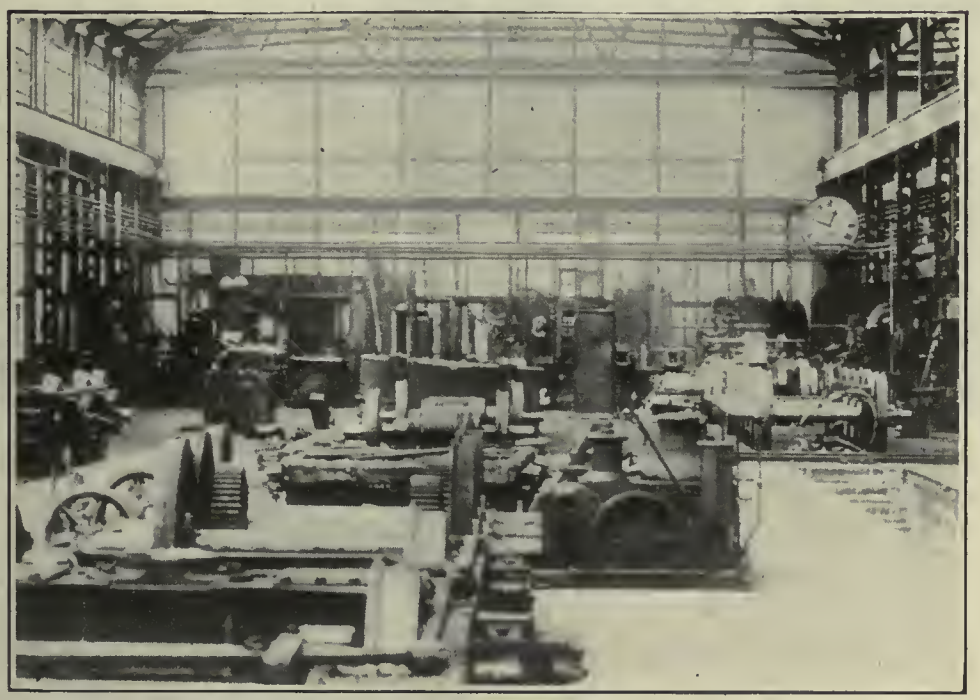


Cars of the Central London Railway Have Been Remodeled to Conform with the Standards of the Underground System

High Standard of Bearing Maintenance Gives Long Gear Life

After an Average Service of 595,000 Miles per Gear, the Maximum Tooth Wear Found Was 0.008 In. and the Majority Showed Wear Between 0.002 In. and 0.005 In. on Electrified Lines of the Southern Railway, England

By A. E. Roberts
Rolling Stock Engineer Southern Railway,
Wimbledon Park, England



Overhauling Shop of the Southern Railway, Where Gearing Is Maintained

MAINTENANCE of a high standard with respect to armature and motor axle suspension bearings has resulted in a surprising mileage obtained from gearing in service on the southwestern section of the Southern Railway of England. The gearing of this equipment is never allowed to get far out of mesh, and the bearings are brought back to their original standard clearance every 100,000 miles. The clearance allowed for new armature bearings is 0.012 in. and for motor suspension axle bearings approximately 0.014 in. In changing armatures or wheels, no attempt is made to keep the gears and pinions paired.

The gearing of these cars was put into passenger service in 1916. A careful inspection recently made as the equipment was going through the shops failed to locate any teeth with wear more than 0.008 in., and the majority showed a reduction of from 0.002 in. to 0.005 in. The condition of the gears is excellent at the pitch line. Below and above the pitch line the teeth are quite dull. The pinions are naturally more polished on the pitch line than the gears, but none was found with greater wear than 0.008 in. to 0.01 in. The root and crown of the teeth are still quite dull, and some showed that they have not yet obtained the bearing surface across the face of the teeth.

None of the gears have been removed for any cause, but nine pinions were removed for apparent fatigue of the structure back of the hardened outside skin. Eight of these pinions were in service for more than four years, and were taken out because they commenced to crumble at the ends of the teeth. The ninth pinion failed in the first year of service; the failure was no doubt due to a crack which developed during the heat treatment. A complete fracture of the tooth for a length of 2 in. from the end resulted.

These gears and pinions were manufactured by the Cincinnati Tool Steel Gear & Pinion Company in the United States. They are heat-treated and are not ground. English manufacturers of gearing have considered that extreme accuracy for railway gearing is essential and the results obtained from American gearing, which is much less accurately constructed, have been watched with great interest. Inspection of the American gears at the time they were placed in service showed that they had cumulative errors over a series of teeth amounting to 0.008 in. Many of the pinion

teeth varied as much as 0.005 in. across the face. These variations are no doubt due to the method of manufacture and to heat treatment distortion. However, in spite of their inaccuracies, they have proved very reliable and as silent in operation as any gearing manufactured in England.

On the eastern section of the Southern Railway, 496 sets of gears and pinions of British manufacture have been installed, and an interesting comparison of the service obtained from these will be available some time in the future. These British gears are of high-grade steel and of such high tensile strength that only manufacturers with the highest class of gear-cutting machinery could generate the teeth. The pinions are of a lower grade of steel, cut, heat-treated and ground after treatment. They are extremely accurate in all respects, the teeth being within 0.001 in. and the cumulative errors over five teeth being not more than 0.002 in.



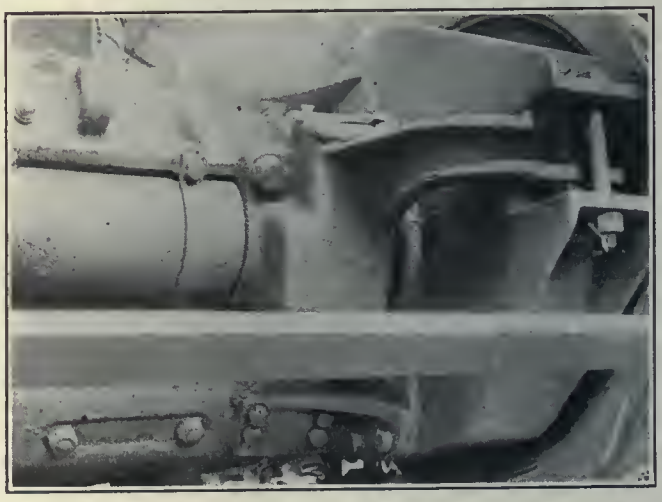






Close-Up Views of American Gears and Pinions After Ten Years of Service
Figs. 1 and 2 show gears and Figs. 3 and 4 pinions after 595,000 miles

It may appear somewhat difficult to reconcile such extreme accuracy in railway gearing, which after being cut requires pressing onto axles. The pinions are forced onto a tapered shaft, which in its turn is fitted to a bearing with 0.012 in. clearance. The bearing is forced into its housing, which in turn is fastened to the motor case. The commercial manufacturing tolerances for all of these fits will, of course, cause spreading of the gearing at the pitch line. Since the gear is pressed on an axle and the meshing of the gear and pinion depends not only on the armature bearings and their housings, but also on the motor axle bearings which support the motor, it may readily happen that the pinion may be in mesh or out of mesh to the total cumulative tolerances and clearances of 0.030 in. or more.



Gear Case Suspension Used. Top and Bottom Center Brackets Were Added to the Original Design

The problem of keeping gears and pinions in proper mesh is one of extreme interest, and although the writer is British, the opinion formed, based on many years of electric traction experience, is that the rough rugged gearing made by American methods is sufficiently accurate for operation in railway service where other factors of clearance and tolerance are quite pronounced.

Not only has the particular make of the American gearing referred to above given exceptional service but gearing on the Metropolitan Railway from 1905 to 1913, which was supplied by the R. D. Nuttall Manufacturing Company of Pittsburgh, showed that no other gears or pinions gave such good results. These were of stub-tooth form and seemed to have an endless life. Conclusions indicate that while extreme accuracy may be desirable in gearing for stationary machinery, it is not necessary for electric railway work.

Some figures as to the service in which our gearing has been used may be of interest. The maximum train weight is 31 tons per gear, and the minimum train weight is 25 tons per gear. Maximum accelerating loads are 325 hp. with driving wheels of 43 in. diameter. A schedule speed of 27 m.p.h. is maintained with an average distance between stops of 1.3 miles, and with occasional service runs that have a distance between stops of 3.2 miles. The free running speed of trains is 54 m.p.h., and coasting at 65 m.p.h. is common.

Gears and pinions are lubricated with small quantities of yellow grease and lubrication depends on the grease thrown on the sides and top of the case falling back on the gear teeth. The 356 sets of American gears in service have a 6-in. face. The teeth are involute with 2 diametrical pitch, the gears having 29½-in. pitch diameter with 59 teeth, while the pinions have 21 teeth.

Bevel Gear and Worm Drives on Cars

Several Two-Axle Designs Have Been Developed Using Both One and Two Motors—Experiments Are Being Carried On by Several Railways

CARDAN-DRIVE developments on German street cars are discussed in an article by H. Japp, chief engineer Ruhrort District Street Railways, Duisburg, Germany, published in the Feb. 12 and Feb. 19 issues of *Verkehrstechnik*. He notes that General Manager Albrecht of the Dortmund Street Railways patented a cardan drive as early as October, 1918, but his first car was not in operation before June, 1921.

As shown in Fig. 1, the Albrecht drive includes two motors which are suspended from the car flooring. These motors drive a large spur gear through insulated flexible couplings. The outer disks of the same couplings are used for the operating brake.

The movement of the spur gear is transmitted to a cardan shaft on each side. Cardan elements are mounted alongside both the spur gear and the bevel gearing connected to the driving wheels. The combined gear reduction between motors and driving wheels is 9.16:1.

The axles are of Albrecht radial type with 4 m. (13.1 ft.) wheelbase. Tests at Dortmund showed that the car so equipped could negotiate a curve of 21 m. (68.9 ft.) at 35 km. per hour (21.7 m.p.h.) without perceptible shock or noise.

The advantages of the foregoing drive are given as follows:

Complete insulation of the motors against grounding.

Transfer of unsprung motor weight on axles to spring-borne weight suspended from the body.

No bearing trouble to cause falling armatures.

No entrance of foreign matter into motors because of rundown bearings.

Motor weight saving because greater gear reduction permits higher motor speed.

Less shock to motors during acceleration.

Larger gear life because they run in an oil bath and are fitted with greater precision.

Elimination of the tire wear and heavy brake rigging incident to wheel braking.

Easier retardation by means of the disk brake.

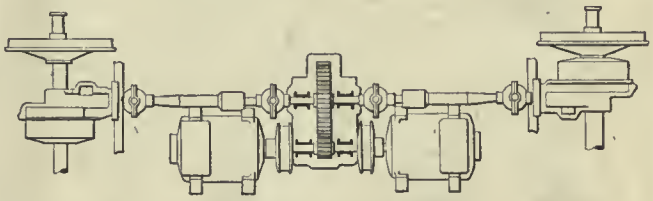


Fig. 1—The First Example of Albrecht-Krupp Cardan Drive Car as Used at Dortmund, Germany

Reduction of unsprung weight increases the life of the track.

Finally, radial axles permit quieter running and easier operation over short curves through the possibility of using a longer wheelbase.

Following 50,000 km. (31,000 miles) operation of the test car, Dr. Miller of Gerthe read an experience paper in the spring of 1924 before a group of operators at Elberfeld. The results were considered so favorable that a number of managements agreed to purchase 25 cars of Albrecht-Krupp cardan drive with the view of interchanging further test data. The first of these cars went into service during January, 1926.

The present cost of a car fitted with Albrecht-Krupp

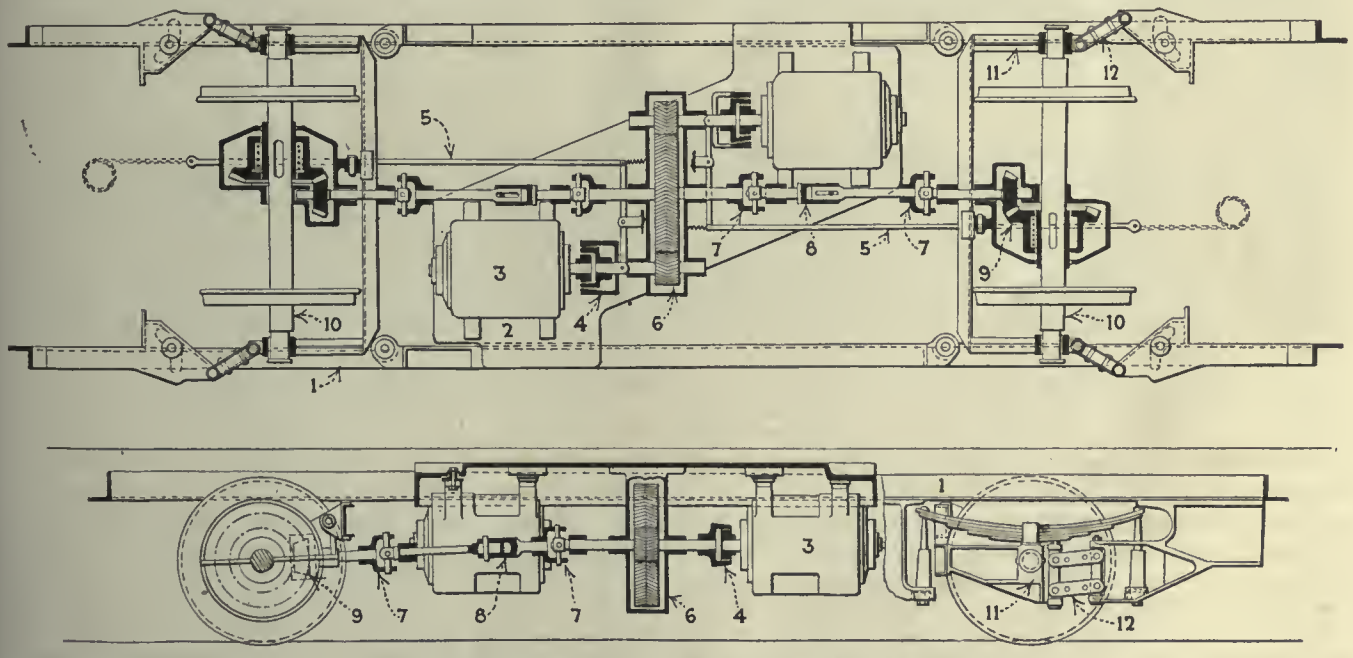


Fig. 2—Plan and Elevation of Cardan Drive Car, Second Type

1—Longitudinal sill.
2—Base plate of motors.
3—Motor.
4—Coupling.
5—Service brake rod.
6—Gearing.
7—Universal joint coupling.
8—Slidable longitudinal coupling.
9—Bevel gearing.
10—Radial axle.
11—Axle frame.
12—Links.

cardan drive and Albrecht radial axles is approximately 10 per cent greater than that of a standard drive and rigid-axle car of equal capacity. It is believed that the lower upkeep cost and other advantages of this drive will more than offset the higher initial cost. The cardan car uses only one controller. Instead of being in line with each other, the motors of the 25-car installation are staggered as shown in Fig. 2,

Because of lack of extensive experience with this construction, the parts were built with a greater factor of safety than appears necessary; but it is believed that later cars could be built 1,000 kg. (2,204 lb.) lighter than the design used hitherto.

In September, 1924, the Berlin Street Railway system equipped car No. 3102 with a combination of plain bearing motors and individual-axle automobile drive,

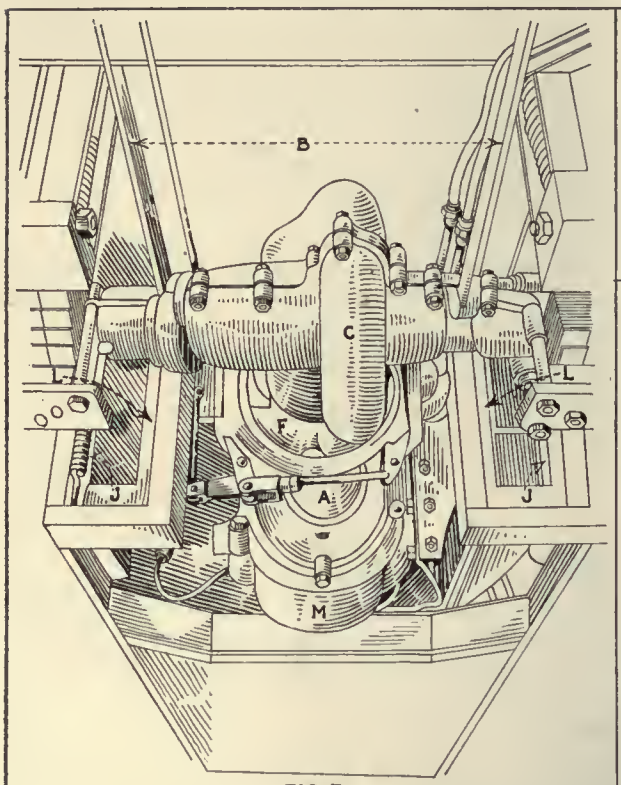


FIG. 3

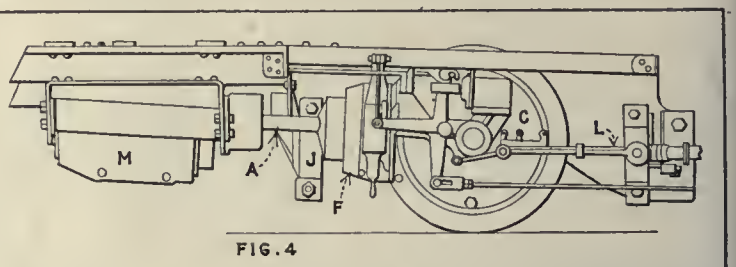


FIG. 4

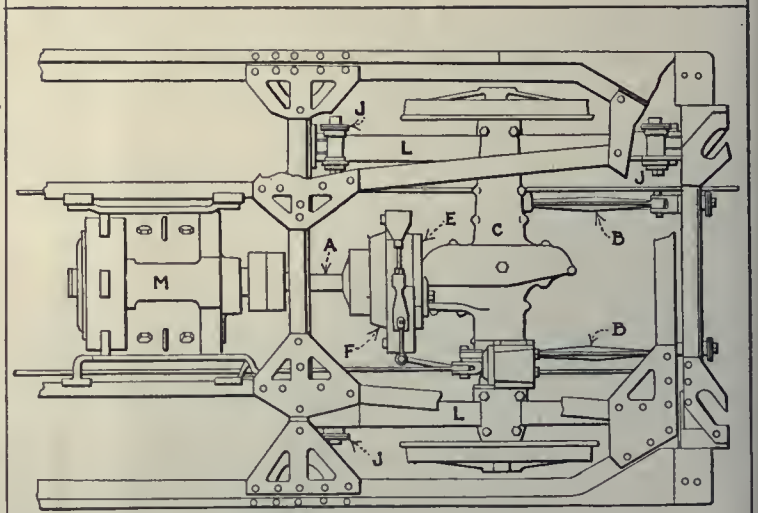


FIG. 5

Paris Car with Cardan Drive: Fig. 3, Seen from Below; Fig. 4, Side View; Fig. 5, Plan
A—Main driving shaft. *B*—Anchor rods for housing. *C*—Gear housing. *F*—Braking drum on main shaft. *J*—Spring hanger. *L*—Leaf springs for body. *M*—Motor.

so one drive remains available if the other fails. The hand brake is equalized to exert the same force on the braking disks of both motors, although this does not so appear in Fig. 2. The emergency brake is of the usual short-circuiting type common in German practice.

The truck, known as the Nolden-Japp type, was designed with particular regard to easy accessibility for all parts of the drive. Pressed-steel framing and a heavy base plate were used, therefore, to avoid cumbersome cross-members. The body is framed so that its end members overlap the truck, thereby avoiding end stiffening members for the truck itself. The body side sills are also clamped around the longitudinal members of the truck as protection against distortion.

The truck carries two Siemens-Schuckert D-340 motors rated at 37 kw. or 50 hp. on a one-hour basis. Each weighs 600 kg. (1,320 lb.) and runs at 1,300 r.p.m. at 550 volts. The first gear reduction is 1:3.84 and the second is 1:2.38.

The wheelbase is 4,000 mm. (13.1 ft.); diameter of driving wheels, 860 mm. (33.9 in.); over-all length of truck, 5,600 mm. (18.4 ft.). The base plate clears the paving by 8 in. when the car is without load. Roller bearings are used wherever possible.

In maintenance, one of the great advantages is that the various parts are more accessible than in the ordinary drive. It is also asserted that the framing plan gives the car greater resistance against collisions.

the latter supplied by the Neuen Automobil-Gesellschaft. The A.E.G. motors, which give 45 hp. at 820 r.p.m., operate through a combination of spur and bevel gearing in one housing to give a total reduction of 1:6.1. The ratio of the spur gearing is 16:40 and of the bevel gearing 14:34. The motors are suspended from the body frame. Disk brakes are used. The wheelbase is 2.8 m. (9.2 ft.) and the driving wheel diameter is 28.4 in. Ten more of this type have been ordered, following satisfactory experience with the first car.

The individual drive scheme of the Berlin car permits the use of shorter wheelbase without too much disadvantage to the cardan drive principle, but the author holds that a long wheelbase is preferable for the sake of easier riding, greater life and lower energy use.

No experiment has been made in Germany with single rather than double-reduction gearing, since this would necessitate the use of heavier, slower and costlier motors without avoiding the need for say a 1:5 reduction. On the other hand, the Albrecht-Krupp drive shows 96 to 97 per cent efficiency in the spur gearing and 95 to 96 per cent efficiency in the bevel gearing. This high combination efficiency permits the use of light, economical motors operated at 1,300 r.p.m. It is held that this efficiency will continue for years, since the Dortmund gearing showed no perceptible wear after 90,000 km. (55,800 miles) of service.

The differences in weight and price of 550-volt motors

of various speeds is apparent from the following table compiled in the fall of 1924:

Hourly Rating, Hp.	Speed, R.p.m.	Weight, Kg.	Price in Gold Mark
50	1,300	600	2,550
45	820	750	3,000
47	550	1,000	3,600

The first cardan car of the Paris street railway was built in October, 1921. Since then some 500 cars have been built according to the designs shown in Figs. 3, 4 and 5. The new cars permit, for practically the same dimensions and motor capacity, a reduction in car weight from 14,000 kg. (30,800 lb.) to 11,500 kg. (25,300 lb.) and of the unsprung weight from 2,800 kg. (6,160 lb.) to 1,900 kg. (4,180 lb.).

In a Paris cardan car 10.65 m. (34.9 ft.) over all with 3.6-m. (11.8-ft.) wheelbase and 850-mm. (33.4-in.) driving wheels, individual drive is used with one 45-hp., 800-r.p.m. motor per axle. The gear reduction is approximately 1:8, which the author considers too great for good meshing and long life. German operators hesitated to use such a great single reduction, also, because of the lower efficiency.

Each motor is connected by means of a universal joint to a cardan shaft only 76.2 cm. (30 in.) long. A second universal joint at the farther end transmits the movement to the gearing. From the housing *C*, which incloses the driving axle and its apparatus shown in Figs. 3 and 5, there are led two flexibly connected rods, *B*. The function of these rods is to transmit the driving power from the wheels to the car body. Large leaf springs, *L*, and intermediate helical springs (to absorb the lighter shocks) cushion the body against the stresses in the underframe. The springs are graduated for a deflection of 10 mm. (0.4 in.) to the metric ton (2,204 lb.). A special spring suspension is also used to prevent transmission of thrust from the axles to the car body when entering curves. The thrust of the axle causes a contraction of the springs, thereby permitting the axles to assume the proper radial position. Following this action, the expansion of the springs causes the axles to return to their normal position.

Car and Crankcase Oil Reclaimed in Washington

New Oil and Waste Reclaiming Plant of Washington Railway & Electric Company Reclaims Crankcase Oil for 14 Cents per Gallon and Car Oil for 5 to 6 Cents per Gallon

ON THURSDAY, May 11, a group of street railway and bus operating officials representing several large Eastern systems inspected the new oil reclaiming department of the Washington Railway & Electric Company, Washington, D. C. This department is located at the company's repair shops and is housed in a separate 30-ft. x 30-ft. one-story building erected and equipped especially to reclaim oil and waste used to lubricate the electric cars operated by the company and to reclaim crankcase oil used in the 30 buses which are in operation. In addition, the plant handles the oil drained from the company's service trucks and also that from the trucks operated by the Potomac Electric Power Company, there being about 100 trucks in all. To effect a saving of crankcase oil drained from the trucks and buses was the principal idea in developing the oil reclamation department, but since it was shown that at small additional expense the equipment could be adapted to reclaiming the car oil and waste as well, a complete recovery plant was finally decided upon.



Oil and Waste Reclaiming Equipment Installed by Washington Railway & Electric Company

1. At left, oil reclaiming outfit with fume condenser. In center, table for test products. At right, tank for dirty car oil.
2. At left, car oil tank. In center, pump for handling car oil and centrifugal waste extractor. At right, waste picking tables.
3. At left, storage cans for reclaimed gasoline and oil. At right, oil reclaiming equipment.

The principal unit in this recovery plant is a No. 300 De Laval crankcase oil reclaiming outfit with fume condenser. This is a complete unit, containing all the equipment necessary to restore used crankcase oil to its original state of efficiency. The outfit consists of a

centrifugal oil purifier, for removing from the oil such impurities and water as it may contain; a wash tank, for chemical treatment and washing the oil in order to remove colloidal carbon; a motor-driven pump; electric oil heater, for keeping the oil at proper temperature during the process of purification; air blower and evaporating tower to restore the oil to its proper viscosity; strainer; sight-flow glass; electric control board and all piping and valves.

Reclaimed Oil Used Same as New

Crankcase oil reclaimed by this outfit is used in exactly the same manner as new oil, being put into drums and sent to the garage for use as needed, there being no effort made to refill with oil containing a certain percentage of new oil mixed with the reclaimed product. Oil recovery amounts to about 80 per cent, the 20 per cent loss consisting of dilution and solid impurities or water. The fume condenser furnished with the De Laval crankcase oil reclaiming outfit condenses most of the gasoline evaporated from the oil, so that in reality the losses are even lower than the above figure would indicate. This reclaimed gasoline is used for washing purposes, and it is stated that the men in the shops prefer it to new gasoline, since it contains a small amount of light oil and consequently does not dry out their hands.

The cost of reclaiming crankcase oil is approximately 14 cents a gallon. The outfit handles oil in batches of 50 gal. each and the average time required to complete the process is eight hours. This time element, however, depends very largely on the amount of dilution in the oil, since the removal of dilution is by far the longest step in the process.

Oil is reclaimed from waste by means of centrifuging in a 26-in. motor-driven De Laval extractor. This machine is equipped so that steam under approximately 5-lb. pressure is blown through the waste while it is being spun, producing a fairly good washing action. This spinning with steam is continued for ten minutes, after which the steam is shut off and the extractor is allowed to run ten minutes more at full speed in order to wring as much water out of the waste as possible.

The same oil purifier used with the crankcase oil reclaiming outfit is employed to centrifugalize solid impurities and water out of the oil reclaimed from waste.

Old Axle Oil Used for Rough Lubrication

The reclaimed car axle oil is not used again for its original purpose as the company uses a large amount of low grade oil for rough lubrication, and finds it economical to end the reclamation process at a point where the oil is suitable for this rough use rather than carry it on to a point where it would be suitable for reuse in the car journals. In this way a couple of cents a gallon is saved on the cost of reclamation without adding anything to the cost of new oil. Car axle oil can be reclaimed at from 5 to 6 cents a gallon.

The company uses a good grade of wool waste which is high in cost but economical to use when a suitable reclaiming process is employed. Recovery of waste averages about 85 per cent and the process costs about 4 cents a pound. The recovered waste is mixed about half and half with new waste and is used again on all bearings. No washing process is employed for waste recovery, the product coming out of the centrifugal extractor grit free and with the colors bright, although somewhat smudgy in spots. That this smudging is not considered detrimental is proved by the fact that the reclaimed waste is used even on motor bearings.

Other equipment in the plant consists of a 225-gal. De Laval tank in which dirty car axle oil is stored, heated and settled before purification, a 1¼-in. De Laval pump handling the car axle oil, a waste picking table, a combination picking and drying table for waste and a metal covered bench for samples, tools, etc.

One man operates the entire oil reclaiming plant and is often able to spend a good part of an eight-hour day at work in the repair shop proper. It is planned eventually to reclaim compressor oil from the cars and the light oil used about the shop for flushing purposes. At this time the waste-saturating operation which is now performed in the repair shop will probably be moved to the oil reclaiming plant and the waste will be washed in purified flushing oil as a pre-saturating step. When this is done the oil plant will probably require the constant attention of the man in charge.

European Studies of Rail Corrugation

IN A PAPER presented at a meeting of the French Electric Railway Association in Lyons last October, an account was given of studies on the nature of rail corrugation by Mr. Clère, way engineer of the Paris Tramway Company. Briefly, Mr. Clère's studies led him to the conclusion that corrugation would best be resisted by a tough, medium-hard steel rail with high elastic limit. In consequence, several sections of rail have been installed on the Paris Tramways under similar conditions of service but with different compositions and physical characteristics. As yet these sections have not been in use long enough to give definite results.

Tests of a different nature on the same subject, conducted under the direction of some of the rail mills in Germany, are described in a recent issue of *Verkehrstechnik*. Cylindrical disks or rollers of steel, whose peripheries were in contact with each other, were revolved under pressure. When these disks were of the same hardness, only the upper one showed any tendency to corrugate. When the upper disk was softer than the lower one, light corrugations could be noticed to appear and disappear on the upper disk as the metal wore away. In the opinion of the investigators, the primary cause of these corrugations was the vibration of the springs used to provide the pressure on the disks. It was also found that the greater the pressure the greater the corrugation on the softer disk, whereas the harder disk did not become corrugated until a pressure of 100 kg. (220 lb.) had been applied for a long time.

Later tests with similar disks by another observer were conducted to determine the effect of different amounts of slip between the revolving disks. As the slip was increased by ½ per cent gradations from ½ per cent to 2½ per cent, the corrugations became more pronounced. There was also an increase in the wear of the metal of from 350 per cent to 400 per cent between the ½ per cent and the 2½ per cent slip.

The author of the article in *Verkehrstechnik* concludes that while none of these tests gives a clear answer to the cause of corrugation, there is hope that the problem will be solved by correlating a large number of scientific tests rather than working from results obtained from rough observations.

Dick Prescott Gets a Summons

And Makes a Trip Downtown



ABOUT a week after Dick Prescott, engineer of equipment of the Consolidated Railway & Light Company, had presented his report to Thomas Mullaney, general foreman, showing the saving that could be made by scrapping the old 200 class cars instead of rebuilding them, he was again called to Mullaney's office.

"Good morning, Mr. Mullaney," said Dick as he entered the general foreman's office.

"Hello, Dick," replied Mullaney pleasantly. "I've got some good news for you. I took up your report at the staff meeting yesterday and Mr. Milburn, the general manager, wants to see you downtown at 11 o'clock."

"Today?" queried Dick a little nervously.

"Yep. The whole staff is sold on your idea and the boss wants to go over your report with you."

"Gee! That's fine. It was mighty good of you to give me credit for the suggestion."

"Not at all. The whole plan is yours and Mr. Milburn is pleased with the way you handled it. You can go ahead with your work until about 10 o'clock and then I'll go downtown with you."

Dick started back toward his office. On the way he stopped in the carpenter shop to see his friend Steve White, the foreman, who had helped in working out the report on car maintenance.

Steve was delighted to hear the good news. "There you go, old boy!" he exclaimed, clapping Dick on the back. "Your days in this shop are numbered. They need men like you downtown, and that's where you're headed just as sure as shootin'."

"Nonsense, Steve, Mr. Milburn simply wants to go over the details of the report."

"Yes, I know that all right, but you just bet your bottom dollar he wants to look you over carefully at the same time."

Dick laughed at the enthusiasm of the carpenter foreman. "I'll be around here for a long time to come, Steve. There's lot's of work for me right out here in the shop. Mullaney's going down with me this morning and I'm hoping we'll succeed in getting rid of those old battleships for you."

"That can't come too soon for me. If we had the right kind of accounts out here they'd have been gone long ago. This company never will know how much money it's sunk into some of those old cars. It'd certainly be a shame to rebuild them again."

Dick left his good friend and went on to his office. It was difficult, however, to keep his mind on his work.

"Is there anything in Steve's idea?" he wondered. "Is a wider opportunity about to open up?"

These thoughts kept buzzing in his mind despite his effort to shake them off. Finally, as the hands on his watch crept around toward 10 o'clock, he laid aside his work and started back toward Mullaney's office. He found the general foreman ready and the two men left the shop together to board a downtown car.

Maintenance Notes

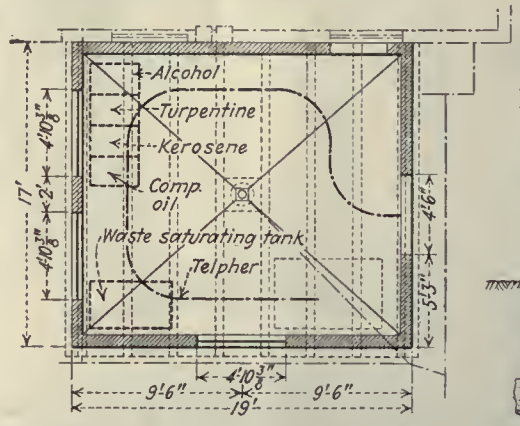
Oil Handling Facilities Improved

By H. T. HURLOCK
Engineer Rolling Stock & Shops Eastern Massachusetts Street Railway

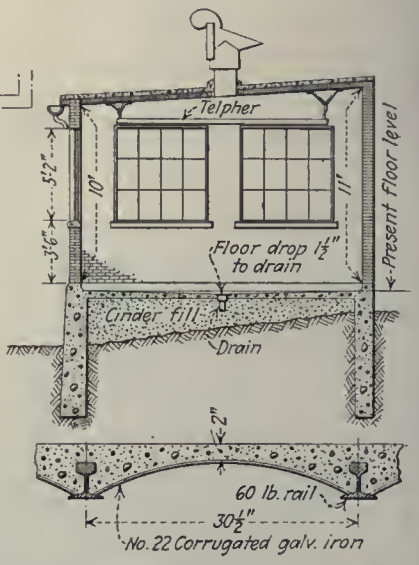
FACILITIES for handling car lubricants have been greatly improved at the Chelsea shops of the Eastern Massachusetts Street Railway by the addition of a new fireproof oil house, designed and built by the shop forces. An automatic waste-saturating machine has been installed which provides saturated waste for the seven divisions north of Boston.

A sheet metal waste tank with compartments for both dry and saturated wool waste has also been installed. This tank is equipped with a hinged cover and counterbalance, the counterbalance cable being provided with a fusible link. Prepared wool waste is put up in metal containers and delivery to the divisions is made once each week. Self-measuring pumps of 1-bbl. and 2-bbl. capacity have been installed to provide storage for the many kinds of oils and greases that are used for the various purposes on the system.

Light wiring is run in conduit attached to roof girders in accordance with the state laws and Fire Underwriters specifications. Lamps are provided with vapor-proof fittings. Steam heater coils are installed around three sides of the oil house and connected with the shop steam system. General dimensions of the new building are 19 ft. x 17 ft. Inside height is 11 ft. The foundation is of 1-2-4 concrete mixture reinforced with scrap iron. Walls are built of hard well-burned brick, using cement mortar, tempered with a small quantity of slaked lime. The floors are of 4-in. concrete, with ¾-in. wearing surface and a 1½-in. drop at the center. A hinged strainer set in the floor is connected to the shop drain which can be seen in the center of the floor.



Convenient Arrangement of Tanks in New Chelsea Oil House



At Top, Ventilation and Drainage Have Been Amply Provided For. Below, Segmental Arch Roof Construction

A segmented arched roof with 1:17 pitch has been constructed of second hand 60-lb. tee rail, set on 30½-in. centers. Corrugated galvanized iron, No. 22 gage, curved at right angles to the corrugations, was set between the rails and a 1-2-4 mixture of concrete poured to a depth of 2 in. above head of rails to form the roof. A coating of ⅛-in. elastic cement was applied to the roof for purpose of waterproofing.

A hand-operated telfer system runs from the receiving door around the oil house about 2 ft. from the walls. This is suspended from roof girders and equipped with a chain hoist for carrying oil drums to the several permanent tanks.

Two sliding fire-proof doors have counterbalances equipped with fusible links. There are three steel sash windows, each containing twelve lights of wire glass 14 in. x 20 in. Ventilation is secured by a 16-in. Acme rotary ventilator.



Construction of This Commodious and Well-Equipped Oil House by the Eastern Massachusetts Street Railway Has Greatly Facilitated the Handling of Lubricants

Aluminum Protection Saves Seat Ends



A Protected End Casting Made of Aluminum Has Proved of Advantage in Increasing Seat Life in Erie

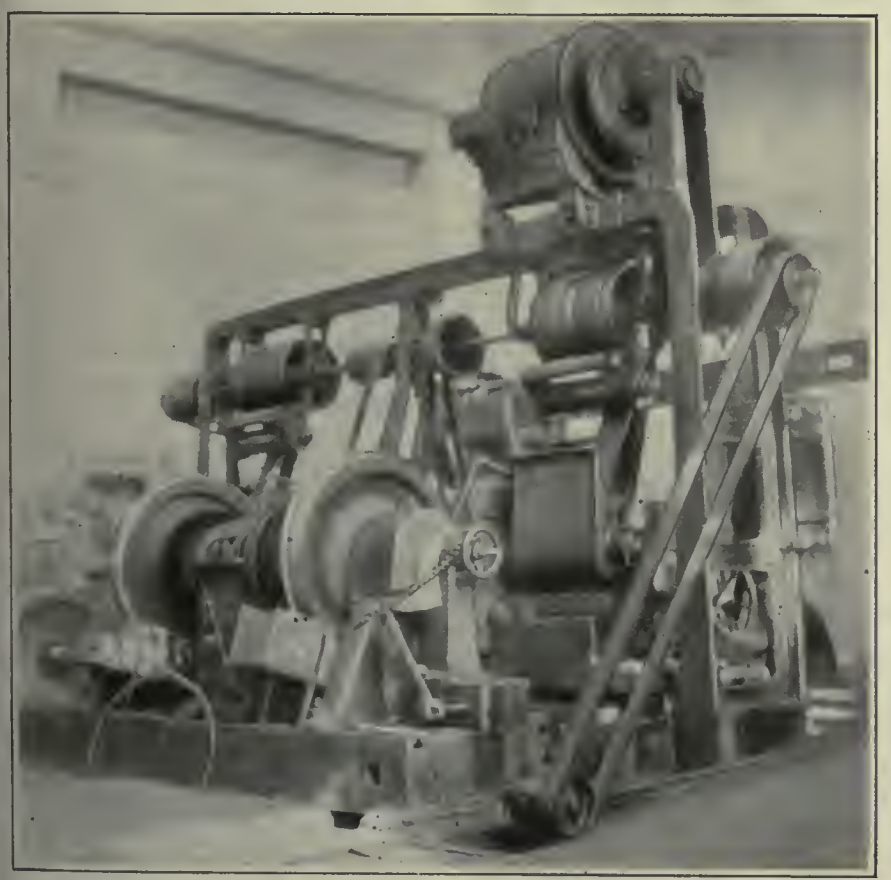
CANE-COVERED longitudinal seats in electric car service wear out first at the ends. In order to provide a protection for its longitudinal cane seats, the Erie Railways uses an aluminum casting. This fits closely over the end and extends down over the cane for a distance of about 2 in. The inside is beveled where it laps over the cane so as to provide a uniform surface. This has proved of great advantage in extending the life of longitudinal cane seats and in keeping them always neat in appearance.

A Million Mile Life for Wheels on Texas Electric

ORIGINAL wheels furnished with the cars purchased by the Texas Electric in 1913 were just replaced last year after twelve years of service. These cars have been running practically every day over the 271 miles of trackage except when held in for inspection and overhauling. On practically all steel wheels, at least 1,000,000 car-miles or more is obtained before the wheels are scrapped.

The method by which this long life is obtained is to build up flanges frequently by electrically welding high-carbon steel on the wearing side of the flanges and grinding both the tread and the flange to shape. Wheels are thus reconditioned every 30,000 to 40,000 miles, which on the Texas Electric Railway means every three to four months.

It has been found that the high-carbon steel used in the welding process has given an even greater life than the original steel flanges.



Grinding Equipment Used in the Shops of the Texas Electric Railway to Shape Treads and Flanges After Worn Flanges Are Built Up by Electrically Welding High-Carbon Steel on the Worn Flange Face. Very Light Cuts Are Made on the Tread

Easy Handling Features Paint Storage



Solvents for Paints Are Handled Quickly and Easily in the Convenient Paint Storage of the Department of Street Railways, Detroit, Mich.

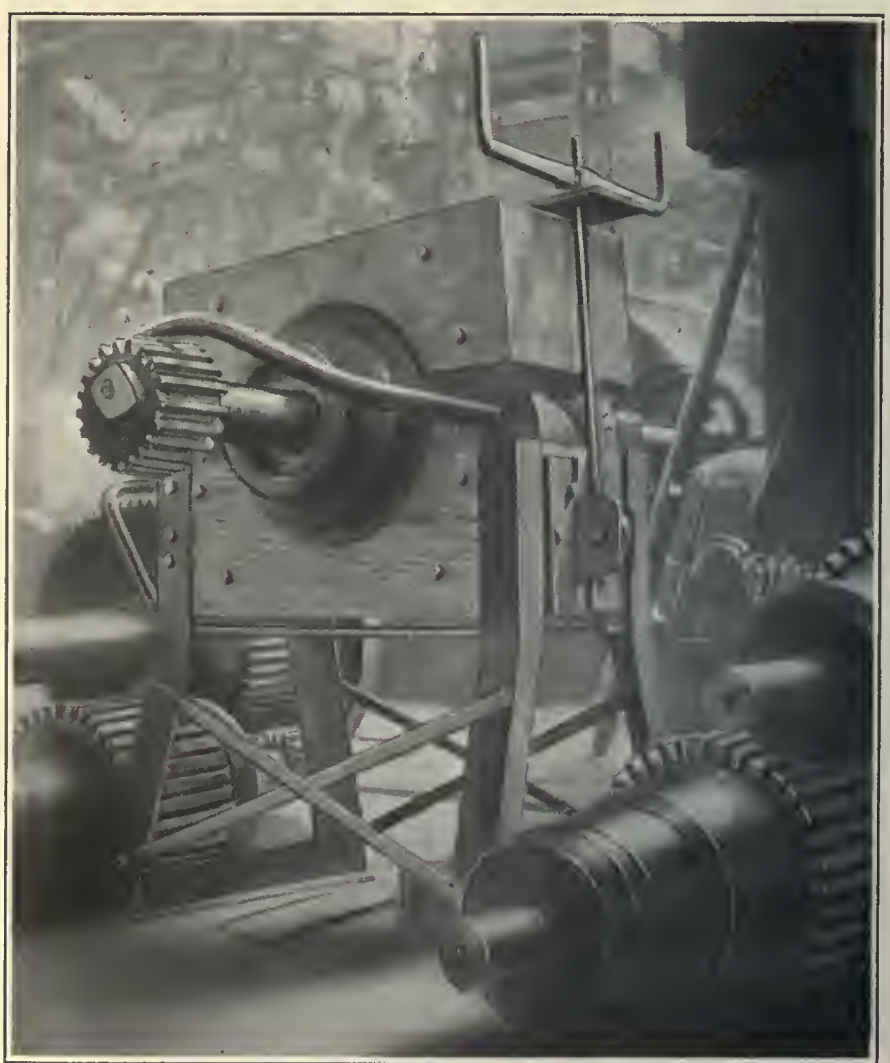
IT IS particularly desirable to provide for easy handling of solvents in connection with any paint storage. The arrangement used by the Department of Street Railways, Detroit, Mich., has proved a great time saver and the arrangement is an attractive feature of this well-planned paint storage. The central part of the room is occupied by a large steel bench; mounted on top of this are six 5-gal. tanks for the storage of various solvents, such as enamel oils, boiled oil, raw oil, japan, substitute turpentine and turpentine. These tanks are kept well above the surface of the bench, so as to leave a space underneath of about 2 ft. A sheet steel framework is arranged as a support. Each tank is provided with a gate valve at the bottom, which is arranged for quick opening.

The sheet steel bench provides for storage of other paint materials, one side being arranged with bins, which can be drawn out to give access at the top. Dry materials are stored in these. The other side is provided with three shelves for the storage of liquid material in cans and also to serve for a storage of open paint. This paint storage department is entirely fireproof and paint cans which are used in the paint shop are returned to the paint storage room each night.

Block for Testing Armature Core Slippage

CONSIDERABLE difficulty had been experienced by the International Railway, Buffalo, N. Y., with open circuits in motor armatures. In spite of frequent inspections the commutator leads would persist in breaking and it was determined that this condition was caused by a loosening of the armature cores, thus permitting the armature windings to slip and placing a severe strain upon the leads to the commutator segments. To detect these loosened cores a wood block clamp was designed to hold the armature firmly in place while the core was tested by means of a long bar used as a wrench.

After making a chalk mark across the core and end of the armature the wrench is engaged with the pinion on the armature shaft and a considerable turning torque is applied due to the ample leverage provided by the long pipe which serves as a handle for the wrench. If any slipping of the core within the armature occurs it may be detected by observation of the two sections of the white chalk line. Considerable facility in handling the motor armatures is obtained with this apparatus and practically any desired number may be tested in the course of a day. In the accompanying illustration the pipe handle of the wrench is not shown. The armatures are clamped in place by means of the hand screw shown at the top of the upper block.



Armature Testing Block Which Is in Frequent Use by the International Railway

Bonding by Zinc Coating Rail Ends and Joint Plates

A NEW method of bonding rails for the return circuit has been developed in Germany. Among the advantages claimed are low cost, good electrical conductivity and no permanent mechanical connection between the joint plates and the rails. In consequence, single rails can be removed easily and renewed. The process, which consists of applying a layer of zinc to the contact surfaces of the rails and point plates, is claimed to be equally suitable for exposed track and for track in pavement. An account of the method follows:

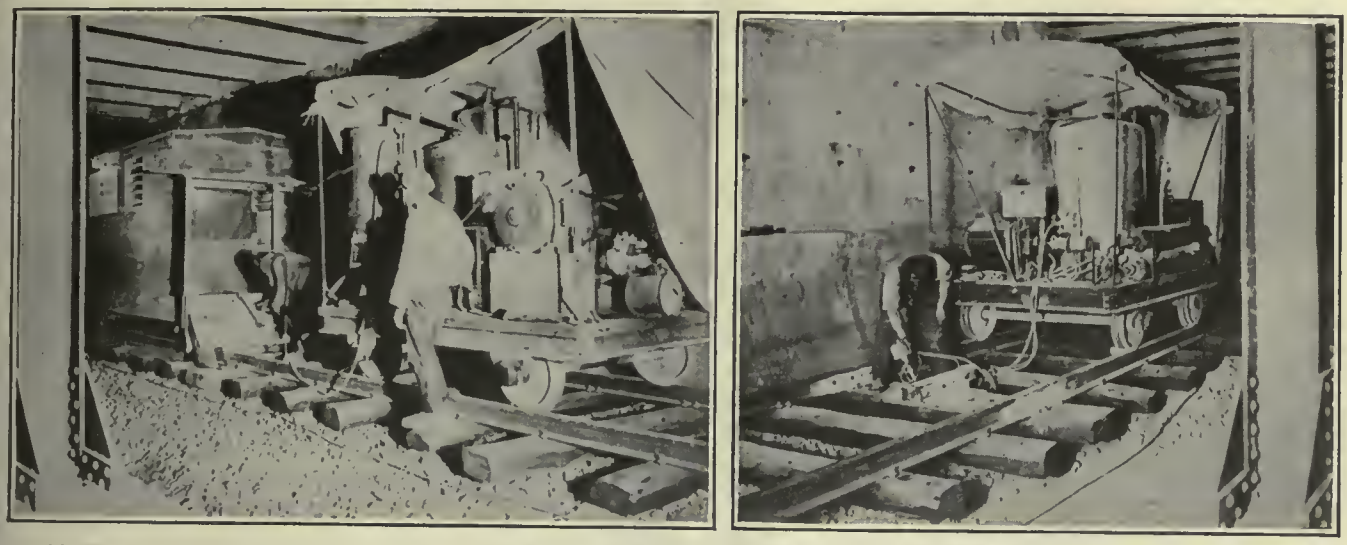
The ends of the rails are first cleaned by sand-blasting. This can be done before the rails are laid, or in place, by the use of a portable equipment. Immediately thereafter the cleaned surfaces are coated with a layer of metallic zinc. This has been accomplished by use of the Schoop process. In this process a small zinc wire is fed into a pistol-shaped tool, where it is melted in an oxyhydrogen or oxyacetylene flame. Concentric to the torch flame is an annular outlet for compressed air, which atomizes the molten zinc. The resulting powerful jet of liquid zinc may be deposited on any surface near by, and the minute zinc globules, it is claimed, imbed themselves therein. After the contact surfaces of the rails and joint plates are zinc coated in this way they are bolted up in the usual manner.

If a portable sand-blasting equipment is used, a considerable saving can be made by catching the sand used in the sand blasting, and using it over and over again. The portable set, as illustrated, comprises a motor, a compressor, the sand-blasting outfit, the Schoop spraying equipment and the gas tanks.

Electrical tests are said to show that the resistance of a joint made in this way is 25 per cent less than that of equal rail length and that as time passes the resistance tends to grow less rather than more. The following figures are given for a rail weighing 40 kg. per meter (or 80 lb. per yard). The copper bond mentioned, in English equivalents, would be of about 600,000-circ.mil cross section and 27.6 in. long.

Type of Bond	Resistance	Specific Resistance	Cost Ratio
1. 1 m. length of rail 40 kg.....	0.000064	1	.....
2. Copper bond 310 sq.mm., 700 mm. long.....	0.000061	0.953	14
3. Zinc treatment....	0.000049	0.765	6

According to this table, copper bonds of very considerable cross-section would have to be used to reduce the resistance of a rail joint to that of an equal length of solid rail. The resistance of a zinc-coated bond is shown as 23 per cent less and its cost less than one-half that of a copper-bonded joint. In addition the proponents of the zinc-coated joint



In This Method of Providing for the Return Circuit, the Ends of the Rails and the Inside Surfaces of the Joint Plates Are Sand Blasted. They Are Then Covered with a Thin Layer of Zinc, Which Is Deposited in a Spray

claim that it provides large contact surfaces, is electrically, mechanically and chemically indestructible, is easy to install even during traffic, and is theft-proof.

The German correspondent who supplied the information for this article did not state whether the method had been used up to the present time other than experimentally. No performance records are available.

New Equipment Available

Jack Principle Used for Pinion Puller

TO PROVIDE a uniform pull with a hand-operated device for removing pinions, the Duff Manufacturing Company, Pittsburgh, Pa., is marketing a new type of pinion puller. It was developed in collaboration with the engineers of the Westinghouse Electric & Manufacturing Company. Puller jaws extend down the back of the pinion to be removed and pressure is applied to the end of the armature shaft through a worm and screw.

The part of the puller which surrounds the pinion consists of two-part jaws held in position by bolts hinged with wing nuts. Particular attention has been devoted to make sure that the jaws line up truly. The jaws are relatively thin, but by employing high-grade material they are made exceedingly strong. The design provides jaws that will fit in a minimum space of ¼ in. between the motor housing and the side of the pinion. The jack part of the pinion puller slides into position in grooves in the front end of the jaws. The jaws and jack are thus distinct units. This makes the pinion puller simpler and makes it easier to attach and detach quickly.

With the pinion puller in position the operator turns up the screw by hand until it makes contact with the shaft of the armature. A few strokes of the jack lever bring the parts into extreme tension and additional strokes provide the pressure necessary for the pinion removal. After the pinion is loosened a few turns of the wing nuts which hold the jaws closed release the pinion so that it can be taken off quickly.

The housing and jaws are electric steel castings. The worm and screw are case hardened and ball bearings are used throughout. A particular feature is the provision made for bringing the end of the screw into contact with the pinion shaft quickly.

The puller complete weighs 50 lb. and is furnished with a 28-in. steel pinch-bar operating handle. Different size jaws are furnished to meet the requirements of varying sizes of pinions.



Puller in Position for Removing Pinions from Railway Motors

Direct-Current Relays for Feeder Circuits

DIRECT-CURRENT relays of a new line, filling a place not previously occupied in this field, have been developed by the Westinghouse Electric & Manufacturing Company, East Pittsburg, Pa. This new line includes resistance measuring, overcurrent, voltage, polarized and relays of other types. They resemble the Westinghouse induction-type alternating-current line.

The new relays operate on the magnetic-vane principle and are superior to previous direct-current relays in that their operating values of current or voltage and their time of operation may be determined with a greater degree of accuracy. They possess adjustable features so that the quantity operating them is adjustable, as well as their operating time. A new form of contact is used which is easily aligned, or removed in entirety for cleaning by the use of a screwdriver. The contacts are made of chemically pure silver.

The resistance-measuring relay, type XM, has been developed for automatic service-restoring circuit breakers and actually measures the resistance of the feeder. It recloses the breaker when indications are that the short circuit has cleared.

A particular feature of the XM relay is its time limit, which prevents the breaker from pumping rapidly when the trouble is of a recurring nature. This new line of relays is particularly useful in automatic substations.

Association News & Discussions

America on Wheels

Samuel M. Vauclain Attributes Prosperity of This Country to Tireless Energy of Transportation People—Buses and Trucks Will Make More Business for Transportation Interests

ENORMOUS increases in the transportation business are predicted by Dr. Samuel M. Vauclain, president of the Baldwin Locomotive Works. His prophecy was made in an address at the opening session of the seventh annual meeting of Division V—Mechanical, of the American Railway Association, held at Atlantic City June 9-16. After sketching a number of developments in European locomotive practice, Dr. Vauclain continued:

"Here in our country, what do we see? We see the greatest prosperity that any country has ever enjoyed. We see a nation built upon a solid foundation, a foundation built by its own people. We are a very autocratic government here. It is autocratic because it is government of the people. The people make their own laws, and then the people compel themselves to obey those laws. There is an autocracy that is apparent wherever you go in the humblest walks of life, or in the highest planes, which we enjoy in our present civilization.

"This present prosperity is due to what? It is due to the tireless energy of the transportation people of this country that had made it possible for the people of a great nation of more than 100,000,000 population to communicate with each other, to have business relations with each other in an almost unbelievably short space of time.

"We are all as though we lived on one lot, notwithstanding that this lot is 3,000 miles wide. No one thinks of distance. No one thinks of difficulties so far as they relate to the transportation of goods or of people. This transportation of the railways has incited additional transportation facilities. The gasoline man has come along with his automobile.

Auto an American Product

"The automobile is used, I might say, almost exclusively in the United States. Nearly 90 per cent of all the automobiles in the world are used in the United States. Almost every workman of any consequence has his flivver. And it is a God's blessing that he has this flivver, because his mind is on that and it is not on something that might give you or his employer trouble. One flivver in a man's family is enough to keep not only himself busy, but his entire family busy, in all the idle time that he may have. You must have something to keep the people employed, and therefore let it be a useful thing; let it be something that will change the radius of life in which he and his family live. The railways have changed the radius of life, so far as he can afford to pay railroad fares and Pullman acommodations, but the flivver has increased the radius of life of the ordinary individual because with a few quarts of gasoline he can go wherever he pleases.

"Automobile buses are the next thing that have come along. People have said, 'Why, these buses are going to drive the railroads out of business.' Gentlemen, don't worry about the automobile buses. It is going to drive you into business. In another ten years, the railroads will hardly know, unless they increase their facilities very much, how to handle this tremendous business that will be built up by the cross lines operated by automobile buses, automobile trucks, everything that can run anywhere without a rail, no matter what it costs.

"The American people don't care for the cost at all; what they want is to be on wheels. If it is not on car wheels or locomotive wheels, it can be bus wheels or automobile wheels.

"Now, it is for the young men in this convention, and the other men, members of it as long as I have been, to put their minds to work, not to find fault with those things which apparently are coming in to drive them out of business, but to embrace those things, enter into them, get the best out of them, apply them to the benefit of the principal business in which they are engaged, namely, railway transportation. We are not going to go out of the railroad business. We are not going to go out of the locomotive business. I expect that during the next 30 years of my administration of the Baldwin Locomotive Works we will have accomplished wonders and that the present locomotives, which we have on exhibit here today, and which represent, along with others exhibited by our friends who are in the locomotive business elsewhere, that which is the highest state of the art, will be a thing of the past before another ten years. And it will be you who will make it so. You will be the cause of it. This association will have much to do with it because these things will be discussed here.

"Don't worry about the future and do not have any regrets of the past. The man who thinks about what happened yesterday is not fit to tackle the problems of tomorrow. So what has passed, let it be passed. What have we today? What are we going to have tomorrow? And every day should bring to us something better. There should be something worth having. There should be something to keep a man busy and keep him at work.

"Let us go ahead and develop our own country. Let us develop our own facilities. Let us introduce the human idea into the work that we do. Let us take care of the man who has to work eight or ten hours every day or probably sixteen, the man at low wage. Let us do everything we can to increase his wage; make it higher. Give him more opportunity to enjoy life, so that he can provide greater privileges for his own family, but at the same time, by your own ingenuity, by the development of mechanical devices, reduce the cost of production so that we can all enjoy that which we have to deal with here in this great United States."

Central Accountants Meet in Chicago July 23-24

CHICAGO has been selected by the Central Electric Railway Accountants' Association for its next meeting, which will be held at the Drake Hotel on July 23 and 24. Following is the program.

Friday, July 23, 1926

Morning Session, Beginning 9 A.M.

Meeting of executive committee.

Address of welcome by C. E. Thompson, vice-president Chicago, North Shore & Milwaukee Railroad.

Problems in Bus Classification, by C. R. Mahan, auditor Chicago, North Shore & Milwaukee Railroad.

Discussion, led by F. A. Healy, auditor Indiana, Columbus & Eastern Traction Company, and A. E. Wafer, auditor Northern Ohio Power & Light Company.

Afternoon Session, Beginning 1:30 P.M.

Daily Reporting of Freight Accounts, by O. A. Small, auditor Chicago, South Bend & Northern Indiana Railway.

General discussion.

Discussion of items submitted in the agenda.

Saturday, July 24, 1926

Morning Session, Beginning 9 A.M.

Operation of the Budget System, by J. A. Seymour, assistant auditor Chicago Rapid Transit Company.

Discussion, led by L. A. Gould, auditor Chicago, Aurora & Elgin Railroad.

Reports of committees, general business and question box.

Americans Receive Membership in German Museum

ON THURSDAY, June 10, a luncheon was held at New York Chamber of Commerce Building in honor of Dr. Paul Rausch, retiring president of the Technical Museum in Munich, Germany. Dr. Rausch presented membership in the board of the museum to Judge Elbert H. Gary, Dr. Michael I. Pupin, E. W. Rice, Calvin Rice and John W. Lieb. Dr. George M. Kunz, president of the New York Museum of Industrial Arts, presided. Brief addresses were given by the recipients of this honor, who were all present.

Budgetary Control for Electric Railways*

Detailed Estimates of Receipts and Expenditures for the Year Prepared in Advance Make Possible a Close Check on Operations and Result in Large Savings

By H. C. Patten
Comptroller Toronto Transportation Commission, Toronto, Canada

NEVER in the history of electric railways was there more need for efficient operation, close executive supervision and departmental co-operation. The object of this paper is primarily to point out and discuss one way or plan which has proved to be extremely effective in accomplishing these results. The meaning and purpose that is intended to be conveyed by the term "Budgetary Control" is the way in which financial estimates (that is forecasts of the operations) of any electric railway can have not only a "directing influence" on the course it will follow but also, and note the word, a "restraining influence." In other words, the budget keeps it on the right course, where it will save money, and not a roundabout, wasteful or inefficient way. And finally, these same financial estimates will, in the last analysis, govern the results as to profits or losses when the company arrives at the end of the year.

Necessity and Advantage of a Budget

The need for some such means of control seems almost self-evident when one considers the present difficulties of operating. The value of the budget system as a guiding and restraining influence in the executive control of an electric railway which is here described is not based on theories in any sense. It is the result solely of practical experience with its actual working. In this case, for purposes of simplicity, the details are confined to its operation in the Toronto Transportation Commission.

In a manufacturing concern the factory production, purchases and all of its activities, in fact, are almost wholly determined and guided by sales expectations. Unless the management of an electric railway has some similar means of guidance, such as is furnished by careful estimates of revenue, how can it intelligently determine the amounts which the various operating departments should expend? Over-production is just as likely to occur in the electric railway business as in a manufacturing company, unless revenue and expenditures are properly related.

Just one more word as to the benefits to be derived from executive control by a budget. They can hardly be emphasized too much. Many commercial and manufacturing companies use this system. The vice-president of the Bankers' Trust Company of New York, a Canadian, by the way, and one of the most prominent bankers in New York says: "A budget is not only a money maker but the greatest money saver ever discovered."

He recently stated that one concern which had lost $29,000,000 in three years of operation prior to 1924 succeeded in showing a surplus of $2,000,000 last year, simply by having a new president and installing a budget system.

The executive head of Armour & Company of Chicago, in speaking of the budget system recently installed in that company, stated that in one year it saved them $10,000,000 in operating costs.

In the Toronto Transportation Commission our operating expenses have been reduced from $8,468,841 in 1922 to $7,390,000 in 1925, and while credit for this cannot all be attributed to the budget system, because much of the savings are the result of installing very necessary modern facilities, there is no question that savings of some hundreds of thousands of dollars have been directly due to the close executive control of every department, which is only possible by control through a budget.

General Principles of Budgetary Control

There are certain fundamental principles in regard to executive control by a budget which should be emphasized:

1. *Agreement with Balance Sheet.*—The budget must be complete and must tie in with the balance sheet of the company and the accounting records. It is a complete estimate of every item of revenue that the company receives and every item of operating expense and of expenditures for interest, sinking fund charges, depreciation, reserves of all kinds, dividends and surplus. If the budget does not set out such a complete statement in detail it loses practically all of its value as a guide to the executives, and as an incentive to the department to attain a definite objective for the year.

2. *Executive Control of Budget.*—The budget must be under the control of the highest executives in the company. No change should be made in the budget once it has been finally approved by the directors or executives, without authority from the same source.

3. *Responsibility of Department Heads.*—The budget must have the support of the department heads and in its details be prepared by the department heads, who must accept the responsibility for their estimates.

No department head is ever anxious to make estimates in detail of labor and material and overhead expense of the amount he proposes to spend during the year. Even if in the past he has been accustomed at the beginning of a year to figure out approximately his requirements, it is a very different thing if he knows that this estimate is to be submitted to the president, general manager, or board of directors and held over his head as a definite promise for the next twelve months.

The department head has been maintaining the power plant, the track, the rolling stock or the overhead system, as the case may be, and has been doing a good job, and doing it rather economically, he believes also. However, looking over his records he finds that, after all, his costs have not come down much for the last few years, and he begins to think that if the president is going to see his estimate, compare it with last year, and watch it month by month, it would certainly reflect more credit on him personally if he could attain a lower expenditure than he has had in the past year or two. It is surprising, when such a start is made, how easy it is to find a few places where economy is possible and yet the standard of maintenance be not lowered at all.

Take the maintenance of way man. He will realize as soon as he starts to make an estimate that it is something he cannot trust to some clerk in his department to prepare for him. Neither will he be inclined to take his track superintendent's word for it, or his foreman's as to the condition of certain sections of track. He will find also that it is not very safe to sit in a comfortable warm office with a map of the system in front of him and put down in real money how much he proposes to spend on those sections. It makes him get out on the street and walk around quite a few miles, not simply drive in his car over some stretch of track and decide that the joints need renewing this year, and that there may be a broken rail or two to be replaced. He will stop a little longer at some intersections and listen to the noise the cars make in going over them. In short, he will know his job a good deal better when he gets through his estimate if he is the right man for the job.

The superintendent of rolling stock

*Abstract of a paper presented before the Canadian Electric Railway Association, Quebec, June 2-4, 1926.

COMING MEETINGS OF *Electric Railway and Allied Associations*

June 21-25—American Society for Testing Materials, annual meeting, Haddon Hall, Atlantic City, N. J.

June 21-25—American Institute Electrical Engineers, annual convention, The Greenbrier, White Sulphur Springs, W. Va.

June 25-26—New York Electric Railway Association, annual meeting, Hotel Champlain, Bluff Point, N. Y.

June 28-July 2—Central Electric Railway Association, summer meeting, S. S. South American, Buffalo, N. Y., to Chicago, Ill.

July 8-10—Midwest Electric Railway Association, annual convention, Brown Palace Hotel, Denver, Colo.

July 23-24—Central Electric Railway Accountants' Association, meeting, Drake Hotel, Chicago, Ill.

August 12-13—Wisconsin Public Utility Association, Railway Section, La Crosse, Wis.

Oct. 4-8—American Electric Railway Association, annual convention and exhibits, Public Auditorium, Cleveland, Ohio.

will not be anxious to put down on paper his exact costs for maintenance of the cars. Things in his shops have been going along about the same for a good many years. When he really thinks about it, has he kept up to date on all the latest money-saving devices? How about the cost of painting cars? He remembers at the last convention he investigated someting about that new system of spraying which would save so much money! And his men are still working with brushes just as they did 30 years before. He must get his estimate down. Hadn't he better do something right away?

Then when he thinks of it, there have been a number of new machines invented in the last few years, all of which means a saving of labor. Possibly he should install some new equipment. Perhaps the lighting or ventilation of his shops is very poor. With modern, efficient facilities it is surprising what large savings in maintenance of cars can be effected.

Even the accounting department chief will be a little averse to making an estimate of the salaries and supplies for his department. Those old ledgers cost a good deal of money and keep quite a staff occupied, and there have been several representatives of office system concerns in to call on him lately to explain how machine posting and loose leaf ledgers will not only save a lot of money but enable him to get out the monthly statements for the directors' meetings several days earlier. So he too begins to do some intensive thinking, and before he is through he also becomes an enthusiastic convert to the budget idea.

In this connection it might be pointed out also that the budget system is one of the most effective means of developing a loyal and efficient staff that could be devised. It points out the weak spots in the organization, it is true, but on the other hand it has the advantage of bringing to the personal notice of the executives the abilities of men who possibly would never be discovered in any other way.

4. *Continuous Supervision of Budget.*—The budget must be kept up to date. The actual compilation of the departmental estimates should be done by the comptroller, or some one in close touch both with the executive and financial work of the company. Having been balanced and approved, it must be continually watched and comparisons made. It is of course difficult to get close comparisons of actual expenses with the estimates, except from monthly figures. Revenue, however, can be watched from day to day.

In order to keep the budget up to date in the Toronto Transportation Commission, the actual work requires about one-half the time of a graduate engineer with some accounting experience and about the full time of one clerk. To install a budget system does not have the effect of adding more clerks to the staff. There is just the opposite result. It eliminates a good many who spend their time preparing statistics and tables, cost analyses and routine reports.

5. *Use of Budget as a Standard of Efficiency.*—The advantage of the budget is that it sets up a standard for the department to work to. For example, the rolling stock department, which has been maintaining the cars at an average of 4 cents per car-mile, will decide that this year will do it for 3 cents. If the department head is enthusiastic himself, he will inspire the master mechanic and the foremen all through the shops with this ideal.

To get the full benefits from the budget system requires co-operation. It is not just a one-man job. The comptroller does not accomplish everything by merely installing the system, although the mere existence of a budget has an important moral effect. The important point is that it forces every department to operate according to a predetermined standard, within predetermined limits, or else exposes that department to the necessity of explanations which are sometimes difficult to make once the budget is in effect.

Practical Working of Budget

With the foregoing principles in mind, the budget system of controlling expenditures was started about three years ago in the Toronto Transportation Commission. Its results have been extremely satisfactory. While many of the difficulties which have been referred to in first undertaking the plan were encountered, it is now working very smoothly and almost automatically.

The budget is an estimate of the financial operations of the commission for a year's period in advance. In its complete form it is a combination of a series of estimates. These include estimates of (a) income, (b) operating expenses, (c) fixed charges. From these three groups it is possible, of course, to strike a balance and determine the probable surplus or deficit for the year, provided that every item of income and expenditure has been included in the estimates.

The estimates of income from all sources are made by the comptroller, as in this commission the comptroller's office is the department in which all financial and statistical reports are concentrated. In order to estimate passenger revenue, it is essential first to estimate the revenue passengers for the year. Admittedly this is not an easy task. It involves knowing considerably more than the total revenue passengers of the year before or even of the trend of traffic for a number of years. The comptroller has to take into account not only general statistics and charts, but also he has to make a careful study of local conditions. He has to know the trade statistics for Toronto, the government employment indices, the bank clearings, building construction and suburban development that may affect traffic, the increases in the number of automobile registrations

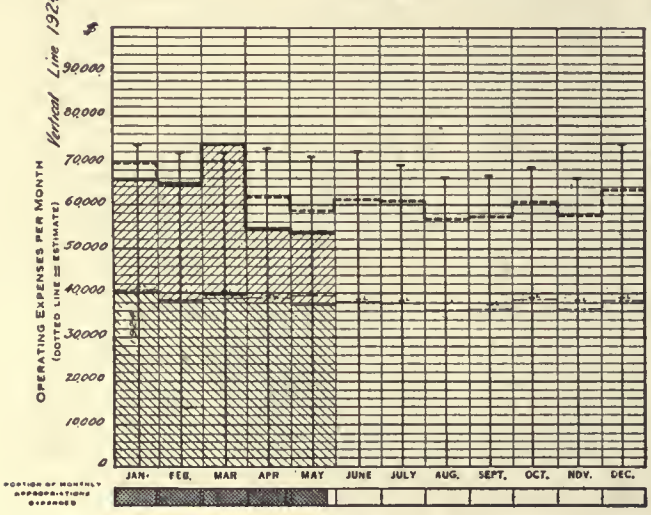
Form No. 1898

TORONTO TRANSPORTATION COMMISSION

OPERATING BUDGET Year 192 5.

ACCOUNT CLASSIFICATION Maintenance of Equipment.

DEPARTMENT Rolling Stock.



ACCOUNTS CLASSIFICATION	A/C No
Superintendence	29
Passenger Cars	30
Service Equipment	32
Elect. Equip. for Cars	33
Shop Mach'y & Tools	36
Shop Expenses	37
Vehicles	38
Miscel. Equipment	39
Retirements	40
Other Oper. Credit	7430

LABOR "L"
MATERIAL
ADJUSTMENTS

MONTH	EXPENDITURES REPORTED			ESTIMATED EXPENDITURES	
	MONTHLY	TOTAL TO DATE	CENTS PER C. M.	MONTHLY	TOTAL TO DATE
JANUARY	65,892.76	65,892.76	2.82	69,800.00	69,800.00
FEBRUARY	64,986.25	130,879.01	3.02	64,200.00	134,000.00
MARCH	73,904.12	204,783.13	3.16	69,980.00	203,980.00
APRIL	54,486.27	259,269.40	2.89	61,530.00	265,510.00
MAY	53,591.43	312,860.83	2.94	58,540.00	324,050.00
JUNE				60,703.00	384,753.00
JULY				60,490.00	445,243.00
AUGUST				56,306.00	501,549.00
SEPTEMBER				57,209.00	558,758.00
OCTOBER				60,380.00	619,138.00
NOVEMBER				57,494.00	676,632.00
DECEMBER				63,208.00	739,840.00
				TOTAL CENTS PER CAR MILE	2.99

REMARKS

This One Form Is Used for all Budget Estimates of the T. T. C.

from year to year; in short, he makes as complete an analysis as any commercial organization would do in estimating on its sales and factory production.

It is needless to say that this one item of passenger revenue is very important and is worth spending some time on, as even a small percentage error means many tens of thousands of dollars when estimating on numbers of passengers which total 180,000,000 per year.

Properly taking the factors into account the estimate is not a guess, but a carefully analyzed judgment of definite facts. The actual results in this commission, in any event, have been far closer than the usual allowance that an engineer would make in preparing his estimates. For example, the estimate of revenue passengers for 1925 was 179,500,000 and the number of passengers actually carried was 180,779,925, a difference of but 0.71 per cent. In individual months there were differences slightly higher than this, but some of these were plus and some minus, so that the net result for the year balanced out.

As another example, the estimate of car-miles for 1925 was 25,078,000 and we actually operated 25,247,058 car-miles. This difference is only 0.67 per cent. It was also estimated that the railway operating expenses (not including motor coach expenses) for the same year would be $7,511,539. The actual costs were $7,350,843, which is 2.14 per cent less than the estimates.

As a matter of fact it is far easier to estimate on the transportation business than any commercial business. It is not at all unusual to have fluctuations due to trade depression of 30 per cent or even 50 per cent in a year's time in some factories. In spite of all our troubles in the electric railway industry, there is a very reassuring steadiness to it.

The other items of revenue from transportation and of non-operating revenue are also estimated by the comptroller. These are usually capable of quite definite computation.

Before the different departments can submit an intelligent estimate as to their expenditures, certain fundamental matters of operation must be definitely settled by the management. The most important of these relates to the car-miles to be operated.

All of the largest spending departments require data on this matter before their estimates can be prepared. Consequently it is essential first of all to prepare as accurate an estimate as possible of the car-miles to be operated in the coming year. This is prepared in its details by the traffic department. A knowledge of proposed extensions is required, studies of the density are made, and every known fact that can have any effect on traffic is considered. The estimates are always divided to show separately the mileage of two-man cars, one-man cars, trailers, etc.

With the figures of expected car-miles to be operated for the year in their hands, the departments are then able to prepare and submit their estimates, not only in dollars, but also to reduce them to a cost in cents per car-mile.

In estimating on the operating expenses, it is extremely important not to overlook any. The responsibility for this falls on the comptroller's department. There are quite a number of general expenses for which no particular department assumes responsibility, and which usually have to be carefully analyzed and estimated by the comptroller. In the aggregate this class of expenses is not large and errors in estimating do not have a serious effect. It is also always safe to allow something for contingencies.

The estimates which have to be made of the fixed charges also are prepared by the comptroller. These include all items of deductions from net income, such as interest and sinking fund charges on the debenture debt, reserves for replacements (which are part of the operating expense accounts according to the I.C.C. classification), reserves for contingencies, taxes, etc. Practically all of these are capable of definite calculation and there is usually no special difficulty in estimating them. Here again it is important to make sure that nothing is overlooked.

Balancing the Budget

The procedure in the Transportation Commission is to submit all of the estimates to the comptroller, who then prepares a final summary of revenue, operating expenses, deductions from net income and surplus.

The first year the budget system was put into effect it appeared at first as though there would be a deficit of three or four hundred thousand dollars. It took a number of conferences before the budget would actually balance and the necessities for economies in operation were brought home to every one. In every case we have been able to balance the budget at the beginning of the year to a satisfactory point, with the co-operation of the operating departments, and not by any arbitrary cuts by the management.

The completed statement for the year is then prepared, setting out the income, the various groups of operating expenses, the deductions from income and the surplus. This statement is then officially approved and becomes the standard which must be measured up to, the compass by which the management can judge accurately the financial course which the system is following.

As has already been pointed out, it is fundamental that the budget be kept up to date if any real value is to be obtained from its operation. For the purpose of budget records we use in the Transportation Commission only one standard form. A copy of the form is shown herewith. It is standard letter size. It was designed to show the results both graphically and in actual figures. Experience seems to indicate that both ways are desirable. The chart, moreover, makes it possible to show the comparative figures of previous years when such are desirable, without making the records too complicated.

At the beginning of the year the approved estimates by months and cumulative for each department are typed in the two lower right-hand columns on the form. At the same time these monthly records are plotted on the chart. For comparison, the vertical lines with the flat cross lines at the top represent the monthly expenditures of the previous year. At the right-hand side of the form are the names of the various accounts for which the department is responsible.

The process of keeping the records up to date is obvious. As soon as the actual expenditures are available from the accounting department, which is usually about ten to fifteen days after the end of the month, they are entered in the columns marked "Expenditures Reported," and at the same time plotted on the chart.

By a different system of cross-hatching, the chart indicates the relative amounts of labor cost and material cost. The small spaces just below the main chart, which are marked "Portion of monthly appropriation expended," are used as a sort of thermometer scale to indicate, at a glance, whether the department is below or exceeding its estimates for the year to date. After the entries of actual cost have been made each month, a blueprint of the master sheet is immediately taken off and copies sent to the departments interested.

By merely crossing out the word "expenditures," we use the same form to compare estimates of revenue with the actual income, or we use it to compare traffic records of passengers or car-miles.

Under ordinary circumstances, each department is responsible for certain definite operating accounts in our standard classification. No other department can use them without proper authority. It has had the good result that items of expense which previously had been nobody's business apparently are now allocated to a definite department.

As a final step in the budget records, the comptroller prepares, every quarter, a summary of the exact position of the Transportation Commission with respect to the gross income, expenditures, fixed charges and surplus, as compared with the original budget figures. This quarterly statement serves additionally to keep the commissioners and general manager closely informed of the course of the business.

Results Obtained from Budgetary Control

It may be desirable to sum up briefly the benefits which can be obtained from budgetary control:

1. There is no more effective way of saving money, and saving it, moreover, in those expenditures which are so important to control, namely, operating expenses.

2. It is the simplest method possible by which an executive can obtain direct control and supervision and exact knowledge of the financial position.

3. It sets up standards of efficiency and develops co-operation and loyalty within a department.

4. It develops co-operation between departments.

5. It develops the right type of executive to the advantage of the company and himself, and at the same time indicates the points in the organization which need strengthening.

6. It develops, and provides in a very accessible form, extremely valu-

able cost data which can be used as a guide to future operations and is not merely of historical interest.

7. It forces a company to make an annual review of every item of expenditure, with the inevitable result that unnecessary expenditures will be eliminated.

Dipping and Baking Are of Great Value in Severe Service*

By D. Chenard
Master Mechanic Levis County Railway, Levis, Canada

DIPPING of armatures is an excellent and worth while practice. The dipping seals up all the cracks and other weak spots which may have developed in the installation of the coils due to vibration, expansion, and contraction. To obtain satisfactory results the process must be done properly. Under our operating conditions where we have seven months of snow, frost and water and extreme variations in temperatures, we have conditions to meet which few companies have. The chance of a breakdown in the insulation of the motor is considerably greater under our conditions, and anything which will help the insulation to stand up under these conditions means a lot to us.

We started dipping armatures in 1923 and excluding bearing troubles our records show an average mileage per failure of 31,915.7 car-miles or 63,831.4 motor-miles for that year. We obtained little benefit from the dipping of the armatures in 1923 as it took more than a year before we had them all dipped and the results did not begin to show up until 1924. The total car mileage per failure per armature including bearings, etc., for the year 1923 was 25,391 car-miles or 51,862 motor-miles. In the year 1924, when the results of dipping armatures began to show, the car-miles per failure increased to 50,857.75 or 101,715.5 motor-miles per armature failure due to electrical trouble. There were no bearing troubles that year, so that these figures cover the total armature failures from all causes.

In 1923 we had sixteen pull-ins for armature failures of all kinds. In 1924 we had eight pull-ins for all kinds, or 50 per cent decrease in pull-ins. There were no pull-ins for bearing troubles. For the year 1925 our records show even a better improvement. We obtained 66,535 car-miles or 133,070 motor-miles per electrical failure, which is a 30 per cent increase in the mileage over the year 1924 and 154 per cent over 1923. Under our winter conditions we sometimes have snow drifting into the motors, which causes dampness, and I have personally examined cars which have been standing at the terminal for a short space of time with the commutators of the motors quite wet. Sometimes we have found the carbon brushes actually frozen in the brush-holders. This will give some idea of the severe conditions we have to face.

With our method of treating, the armatures are first placed in our electrically heated oven at a temperature of 185 deg. F. for about three hours. The armatures are then taken and compressed air is used to blow out all dirt and dust. It is then tested at 550 volts. If this test is successful 1,100 volts is then applied. If this pressure is withstood we double the dose and apply 2,200 volts. The armature is then placed back in the oven over night at the same temperature as before and it is then taken out and dipped in a special round vertical tank using black plastic varnish, and it is left in the tank for an hour till the varnish has thoroughly penetrated into all the cracks and weak places. The varnish is heated up considerably by the heat from the armature and thins off accordingly so that it penetrates better. The armature is then lifted out of the tank and is allowed to drain off for five hours, after which it is placed back in the oven to dry out. It is very important that this last phase of the operation be done properly for if the varnish is not hardened properly it is thrown off by the armature when in operation under heated conditions. We, therefore, leave the armature in the oven at full temperature for approximately 72 hours.

It may be argued by some that dipping of armatures tends to make the coils brittle so that in case of repairs the whole armature has to be stripped and rewound. The use of plastic varnish reduces this danger considerably and it is our experience that with the modern motors where the windings are tight it is not possible to make a satisfactory repair which will stand up to operating conditions whether the armature is dipped or not. On the old type of motor where the coils are loose in the slots it is, of course, possible to repair them and make a fairly good job without rewinding even when they are dipped, which process we carry out with the old type. The main question is to keep the cars on the road and avoid all breakdowns or pull-ins. A weak armature due to repairs will cost more than if it was rewound properly. We figure that every car pulled in off the road costs us about $8.75 each without counting the loss of the car itself from off the road. This amount would be more if we had to send an extra car out to haul the other one in.

*Abstract of discussion before the Canadian Electric Railway Association, Quebec, June 2-4, 1926.

ARMATURE FAILURE RECORD SINCE DIPPING AND BAKING WAS STARTED

	Car-Miles	Motor-Miles	Number of Bearings Changed	Number of Armatures Changed
1923	414,905	829,810	3	16
1924	406,862	813,724	1	8
1925	399,214	798,428	10	6
Total	1,220,981	2,441,962	14	30

Three year average motor-miles per armature changed.....	81,330
Three year average motor-miles per bearing changed.....	174,600
Three year average car-miles per armature changed.....	40,666
Three year average car-miles per bearing changed.....	87,300

Canadian Association Appoints Auditor

IN THE list of officers of the Canadian Electric Railway Association published in the June 12 issue of this paper the name of the auditor was omitted, as it was not included in the official list. The appointment for auditor for the ensuing year is L. Tait, manager and secretary-treasurer London Street Railway, London, Ont.

Midwest Association Announces Program

SPECIAL cars will be run from Kansas City to Denver for the electric railway and supply men attending the third annual convention of the Midwest Electric Railway Association to be held in Denver July 8-10. Arrangement has been made with the Burlington line to run the special cars on the train leaving Kansas City at 10:30 a.m. on July 7, and due to arrive in Denver the following day at 7:30 a.m. Entertainment for the ladies will be provided en route.

Those desiring accommodations on the special cars should notify Secretary J. A. Weimer or D. L. Fennell of the executive committee at the association's headquarters, 530 Railway Exchange, Kansas City, Mo.

Entertainment features include visits to Lakeside Park on Thursday evening, to Elitch's Garden on Friday evening and to Lookout Mountain on Saturday afternoon. The annual banquet will be held at the last-named place Saturday evening. Frank R. Coates, president American Electric Railway Association, will be the principal speaker.

Thursday, July 8, Beginning 9:30 A.M.
Registration and address of welcome.

1:30 P.M.
"Electric Car of the Future," by J. M. Bosenbury, superintendent of motive power and equipment, Illinois Traction, Inc.
"Modern Methods of Equipment," by R. W. Bailey, superintendent of power and equipment, Kansas City Railways.

Friday, July 9, Beginning 9:30 A.M.
"The Interurban Bus," by B. W. Arnold, manager motor coach department, Chicago, North Shore & Milwaukee Railroad.
"The Human Element in the Industry," by F. G. Buffe, general manager for the receivers Kansas City Railways.

1:30 P.M.
"Mass Transportation and the Automobile," by Ernest Stenger, president Denver Tramway.
"Fares, Passes and Transfers," by B. W. Frauenthal, general traffic agent United Railways of St. Louis.

Saturday, July 10, Beginning 9:30 A.M.
"Modern City Track," by Nelson R. Love, chief engineer Denver Tramway.
Election of officers and business session.

American Association News

Entertainment

AT THE meeting of the entertainment committee held in Atlantic City on May 21, several sub-committees were appointed to prepare data on many features for the entertainment of delegates and ladies who will attend the Cleveland convention in October. No definite plans have been announced.

Those attending the meeting were Chairman S. J. Cotsworth, Harry Brown, Fred Bullock representing Col. J. H. Alexander, Fred C. J. Dell, Harry Doyle, T. O. Kennedy, C. S. McCalla, E. P. Waller, J. W. Welsh, Roy Hauer, C. S. McCreery and J. B. Stewart.

Rapid Transit

FUNDAMENTAL data collected and compiled by the rapid transit committee's engineer, E. J. McIlraith, in accordance with an outline prepared earlier in the year, were discussed in a meeting of the committee held at association headquarters on June 10.

It is the plan of the committee to set up in its report such information and data as will serve as a guide in the determination of the rapid transit policy of any community. There was some question of the advisability of submitting this year any definite recommendations regarding the proper or equitable basis for financing construction as between the car rider, the community at large, and benefited property. It was the opinion of some members of the committee that a definite recommendation on this subject would be premature at this time and that the purpose of the report this year should be merely the submission of the information compiled.

Those present at the meeting included G. A. Richardson, chairman, Daniel L. Turner, W. S. Menden, James Walker, Edward Dana, S. E. Emmons, F. H. Shepard and E. J. McIlraith.

Power Generation and Conversion

MATERIAL to go into the final report of the power generation and conversion committee was given the finishing touches at the committee's meeting held at association headquarters, New York, June 1 and 2. Members of the committee present included L. D. Bale, chairman; C. A. Butcher, H. W. Codding, F. W. Peters, L. J. Turley, Mr. Pennington representing C. E. Bennett, and Mr. Vandeventer representing G. W. Saathoff.

The sub-committee on review of existing Manual sections reported that the prime movers committee of the N.E.L.A. had done little in connection with fuel specifications this year, and as action by the power generation and conversion committee depends upon N.E.L.A. recommendations there is little to report. In connection with high-tensile strength bolts for use on superheated steam pipe lines, a ballot is being taken by the American Society for Testing Materials on the adoption of tentative specifications submitted last year and final reports will depend upon this adoption.

A very comprehensive report on existing practices in design and operation of automatic substations, including the subject of remote and supervisory control, was submitted and approved with a few minor changes. There was considerable discussion in regard to a report on the application, characteristics and present status of the mercury arc power rectifier for electric railway service. The committee considers this a very important subject, and a special session of the sub-committee working on this will be called for the purpose of revising the report.

The sub-committee on the ventilation and reduction of noise in automatic substations reported the completion of ventilating tests on a naturally ventilated plant in Baltimore and mechanically ventilated plants in St. Louis, Los Angeles and one of the stations of the Public Service Production Company of New Jersey. Mr. Keller of the Carnegie Institute of Technology, Pittsburgh, Pa., was requested to prepare a discussion for inclusion in the final report on the subject of characteristics of ventilators under various wind pressures, taking into consideration the effect upon discharge of the ventilator due to the accumulative effect of wind velocity and temperature.

Heavy Electric Traction

REPORTS of sub-committees were received at the meeting of the committee on heavy electric traction of the Engineering Association, held in the sun parlor of the Hotel Strand, Atlantic City, on June 11. Members present were H. F. Brown, chairman; Morris Buck, secretary; A. H. Armstrong, H. W. Cope, W. A. Burnham representing A. H. Daus, J. H. Davis, E. P. Chase representing J. V. B. Duer, J. T. Hamilton, J. O. Madison, M. W. Manz and L. S. Wells.

A very complete report has been prepared by the sub-committee on track and third-rail bonds. Information has been collected on the practice of a number of roads. A standard basis for comparison of bond resistance has also been developed and presented in a series of charts and tables.

It was decided to proceed with the publication of the bibliography of heavy electric traction subject to the approval of the association. Further information has been collected and compiled on the subject of articulated trains. This information supplements the complete report of the 1924 committee. Other subjects considered include material in the Engineering Manual, branch-line electrification and self-propelled cars, and data on locomotives and multiple-unit cars.

Power Transmission and Distribution

A BUSY two-day session, June 7 and 8, constituted the final meeting of the power transmission and distribution committee. This was held at the association's headquarters, New York. The following members were present: Charles H. Jones, chairman; J. Walter Allen, W. H. Bassett, M. W. Cooke, J. C. Damon, James H. Drew, C. L. Hancock, C. J. Hixson, A. J. Klatte, F. McVittie, H. S. Murphy, J. F. Neild, W. J. Quinn, W. Schaake and A. Schlesinger.

The sessions of June 7 were devoted exclusively to meetings of the various sub-committees, when reports were put into shape for final presentation. The general meeting occurred June 8. In connection with the review of existing Manual sections it was decided that the name Western white cedar be replaced by the name Western red cedar, to bring the terminology in line with the practice of the American Engineering Standards Committee. Other paragraphs will also be written to conform. Several changes were decided upon which will be made in the specifications for rubber insulated wire and cable for power distribution purposes, the specification and form of contract for electrical conduit construction and specifications relating to poles.

The sub-committee on catenary material specifications found much of the present material now common with specifications for direct suspension material. Recommendation was made that a separate heading be added to take care of this for catenary construction and that the material be left under direct suspension specifications.

In going over specifications for trolley wire wear, the committee found some changes desirable in order to make the association specifications conform with those for the American Society for Testing Materials.

Considerable interest was manifested in the discussion of the report on radio interference. Various sources of interference from electric railways were discussed and analyzed. Details of tests and experiments will be included in the final report, together with experiments which have been made in some other countries.

In considering revision of specifications for 600-volt direct suspension trolley overhead construction, the committee found that the American Engineering Standards Committee is working on similar specifications, and it was felt that the matter should be left as it is for the present and developments watched carefully.

A draft of the main points to be considered in an agreement for the joint use of poles was submitted, and it was decided that the sections headed "Practices of Joint Use" should be revised and rewritten.

New subjects suggested for consideration by next year's committee included clearances between trolley collecting devices and trolley wire fittings, comparison of economics of operation of trolley systems, and specifications for caps and cones.

The News of the Industry

Senator Urges Terminable Permits

Illinois Legislator Recommends Relief from Tax Burdens Be Extended to Electric Railway

State Senator Richard J. Barr, Joliet, declared in a newspaper interview on June 11 that the terminable permit idea appeals to most reasoning persons who have given adequate study to the question. Senator Barr, who is chairman of the Illinois Legislature's joint commission on terminable permits, stated that he was not speaking for the commission but merely giving his own personal impressions.

He could think of no valid reason why a utility should not be permitted to give the service for which it is organized. As he sees it, most students of the matter are of the opinion that short-term franchises hinder, and sometimes prevent, a utility from financing itself upon any proper basis. It follows that without proper financing a utility cannot give adequate and fair service. He said:

> There were excellent reasons for a short-term franchise. When it was fully justified, there was no attempt at regulation. The city, in granting a franchise, said that there must be a day of reckoning, a squaring of accounts. Accordingly, it fixed a short term so that there could be a readjustment with expiration of the franchise. But that was before the days of regulation. Now it is different.
>
> No utility should have a franchise for a month beyond its good behavior. A terminable permit seeks to grant a right to operate only during good behavior, so long as the utility gives good service at a reasonable charge. When a utility is unfair, when it charges too much and gives too little, its right to operate should be terminated.

In questioning the soundness of provisions in the traction ordinance now pending in Chicago, which would compel the surface lines to pay more than 5 per cent of gross receipts as city compensation, pave between the tracks and clean and sprinkle its part of the streets, Senator Barr declared:

> The car rider should pay only the cost of his transportation. Why put a special tax on him for the benefit of the government? There was a time when compensation was rightfully exacted. That was in the days of horse cars when the horses wore out part of the pavement. But electric cars today do not wear out pavements.
>
> A large city needs rapid transit, surface lines and buses. They should supplement each other, not compete with each other. Only by operation in harmony can they supply the best service, and that really is the objective of all of the discussion of transportation, or should be. The fare payer should get it at a reasonable fare.

In referring to the proposal to build subways by special assessment, he added:

> It is unfair that the Chicago car riders should be compelled to pay $45,000,000, the amount at which the fund now stands, with which to build a subway. It is my notion that subways should come from general and special taxation. That is the tendency, in part, in Paris, Rome, New York, Philadelphia and Boston. The car riders should not be penalized. They have some rights. They should not be imposed upon for the benefit of other residents.

New Cars Demonstrated to Richmond Residents

Residents of Richmond, Va., were permitted by the Virginia Electric & Power Company to ride free on May 31, when the company placed in service two of its new cars, part of the shipment of fifteen recently received for service on the Ginter Park-Fulton line. Specifications of them were published in the JOURNAL for May 29, page 953. Two of the cars were operated for demonstration purposes up and down Broad Street on May 31 between 9 a.m. and 4 p.m. A demonstrator was placed aboard each car to explain its new features to the passengers. The cars are scarlet in color, with a white roof and blue trimmings.

One-Man Cars in Downtown Milwaukee

Milwaukee's recently instituted six months experiment of one-man car service through the downtown district on the Walnut Street line seems to be meeting with success from the very outset, both from the standpoint of the public and the company. According to reports of the first four days of operation under the new service made by the traffic department of the Milwaukee Electric Railway & Light Company a total of 121,961 passengers were carried, as compared to 115,186 passengers counted during a four-day check made of two-man car service the week prior to the adoption of one-man service. No complaint on the part of the public has been made against the service. Only five accidents of a minor character were reported. These, however, were declared not to be attributable to the cars.

The Deadhead



As San Francisco Sees Itself

Buses Not Favored by Cleveland Suburbs

Protests against substitution of bus service for trolley lines have been registered in Lakewood, Cleveland Heights and Euclid, Ohio. The Lakewood Council, three to one, tabled the Cleveland Railway proposal of a 60-day trial of buses instead of the Clifton Boulevard trolley line. The added cost of bus service, especially for school children and persons riding within Lakewood limits, was the principal argument advanced. Joseph H. Alexander, vice-president, guaranteed five-minute service, a seat for every passenger and free transfers to proposed intersecting bus lines. Ten cents was the maximum bus fare, but there was a possibility of a reduction, he said.

The Cleveland Heights Council and Mayor Frank C. Cain do not favor any proposal to substitute buses for the Fairmount Boulevard line and asked that the railway extend the Fairmount line half a mile to Canterbury Road and the Euclid Heights line in Mayfield Road 1¾ miles to Warrensville Center Road.

Indictments of Strikers at Buffalo Dismissed

United States District Judge John R. Hazel has *nolle prossed* 28 federal grand jury indictments charging conspiracy and various other offenses in connection with the dynamiting of the Buffalo-Niagara Falls high-speed line of the International Railway, Buffalo, during the strike in 1922. Application for the dismissal of the indictments was made by Richard H. Templeton, United States attorney for the western district of New York. The court was told there was not sufficient evidence to warrant the government to continue the prosecution of the defendants. The charges in almost every case were conspiracy to interfere with interstate commerce.

Among the defendants dismissed by the court were Robert C. Lacey, former New York State Senator; John M. Parker, former president of the Buffalo branch of the Amalgamated; William B. Fitzgerald of Yonkers, national organizer and vice-president of the Amalgamated. Three men were convicted when the original indictments were returned. Each was sentenced to a year in prison and fines ranging from $2,000 to $5,000 were imposed. At the trial a year ago of other defendants all were acquitted.

New Cars in Service in Grand Rapids

Twenty-seven Coaches, Bedecked with Flowers and Flags, Form Part of a Public Utility Parade and Service Demonstration That Was Impressive, Educational and Memorable



Part of Grand Rapids Parade of New Coaches Passing Through the Square

IN A TRIUMPHANT parade viewed by one of the largest crowds assembled there in recent years, the Grand Rapids Railway, Grand Rapids, Mich., demonstrated its 27 new electric rail coaches on Saturday, June 12. The event was made a holiday by Grand Rapids residents, who had patiently waited for the company to complete its tests of three types of modern improved coaches expected to set a new standard of equipment for the industry, and especially meet the needs of Grand Rapids patrons. Weather conditions were ideal—in sharp contrast to the cool, rainy days previous to the parade. Keyed up to a desire to see the new coaches, people jammed Monroe Avenue, the side streets and the residential district through which the coaches passed and applauded the attractive new vehicles. The day after the parade the new coaches were placed in regular service.

The parade started from the Hall Street carhouse. It was scheduled to move at 1 p.m., but the large number of photographers and newspaper men, making movies and "stills," delayed the start until nearly 2 o'clock. Traffic was virtually suspended on Division Avenue as the parade headed by motorcycle police rolled through that street and entered Monroe Avenue, swung around the Ottawa Avenue loop and really passed in review through the heart of the city.

All of the 27 new coaches were bedecked with flowers and flags. They were preceded by the first horse car operated in the city, an old 16-ft. type of 1880 car, a 1900 type of car and another of more recent design, all arranged in the order named. After these came the Minnesota, the St. Louis and the Ohio, all modern cars, offering a picture of street railway progress that was impressive, educational and memorable. Fifty city organizations—noonday luncheon clubs, women's clubs, improvement associations, schools, civic bodies, past and present city officials—were guests of the railway and rode in the new coaches. Six bands made the parade heard as well as seen.

Descendants of the pioneers for whom the coaches were named were the honor guests. Many of them, pleased with the honor paid their relatives, were accompanied by invited guests. Also included among the guests were staff correspondents of the ELECTRIC RAILWAY JOURNAL, *Railway Age*, the *Saturday Evening Post*, and Chicago and other Middle West newspapers.

After leaving the downtown district the parade proceeded out Cherry Street to Ramona Park, but returned to Monroe Avenue where it split. The coaches then made their maiden trips over the routes they will henceforth serve.

RAILWAY MANAGEMENT CONGRATULATED

City officials, citizens and visiting railway representatives congratulated L. J. DeLamarter, vice-president and general manager, for his company's and his own accomplishment in creating a new and ultra-modern type of electric rail vehicle to meet the competition of the private automobile by offering to the public more comfortable, luxurious city transportation. Thanks were also extended to him from all sides for dedicating the new coaches to the people of Grand Rapids. City officials predicted that Mr. DeLamarter's effort to give the citizens railway service unexcelled by any other city comparable to Grand Rapids in size would prove invaluable, if the demonstration of the performance of the cars and their unprecedented reception were any criterion. Many citizens who have not been in a street car for years rode in the new coaches during the parade and pledged themselves in future to reserve their autos for pleasure purposes.

An analysis of the reaction of the people to the new coaches during the first few days after their installation seems to indicate that the people are especially pleased with the low steps. The luxurious seats and comfortable cushions are coming in for favorable comment, and the lighting arrangement, which permit of reading in any corner of the car, is greatly appreciated. So far as men are concerned the smoking compartment is a decided hit with them. This is a clubby arrangement of seats in the rear for patrons who find pleasure in My Lady Nicotine.

The step-well received its first tryout on Sunday, the day the new coaches went into service. It rained that day, but patrons found the step-well permitted them to enter the coaches quickly and under shelter.

The semi-noiseless operation of the coaches is also appreciated by the merchants in Monroe Avenue. One of them said to the correspondent of the ELECTRIC RAILWAY JOURNAL on Monday that "it is now possible for me to converse with my customers without yelling at the top of my voice when the street cars go by that I may make myself heard, or without cupping my ears to hear what the customer says."



Old Friends of Daniel H. Waters Riding in Car Named After Him

Residents along the routes on which the new coaches are operating also comment on the reduction of noises.

Easy exits from the coaches is another feature that is winning popular favor with Grand Rapids patrons through the new automatic rear-door treadle. Children have discovered the "slick way" they can alight from the car and are rapidly showing their parents the "new trick." Operators report that the treadles are helping them to handle the crowds on the downtown loading platforms during the rush hours.

In an interview in the Grand Rapids *Herald*, Mayor Elvin Swarthout in commenting on the new coaches said:

> Grand Rapids may well be proud of the enviable position which it holds in pioneering the development of transportation beyond the stage which had been accepted as standard. The new coaches are a revelation of convenience and comfort, and great credit is due the officials of the company for the enterprise and zeal expended with such splendid results.

City Commissioners George F. Gruenbauer, John D. Karel and others declared the new coaches were a tribute to the vision of the management.

Gerald J. Wagner, the city's consulting engineer, who has followed closely the progress of the company since the granting of the 1918 franchise, expressed satisfaction at the happy climax of co-operation between the City Commission and the railway officials. In an interview in the *Herald* he said:

> There are innumerable instances of cities where progress has been impossible because of the friction and distrust between the company and the municipal government. Grand Rapids is fortunate in having worked out a plan for utility regulation which offers the most friendly co-operation with the company and does not hamper company initiative. Mr. DeLamarter and the company are to be congratulated for giving to Grand Rapids this acme of coach progress, a memorable milestone in the march of street railway progress and city transportation.

The *Herald* said editorially:

> The men responsible for the Grand Rapids Railway are of right supremely proud of the 27 new coaches which today will make their first public appearance. With them the people of Grand Rapids have a right to feel proud; and with the managers the people also deserve a share of credit for the thoroughness of this improvement. Month after month—ever since fire destroyed a large part of the local company's rolling stock—the public has ridden without protest in weather-beaten, ramshackle antiques. Confident of the accomplishment which today is revealed the public co-operatively made no protests. Because Grand Rapids always has had good railway service and the best of cars, this complacent acceptance of less than the best deserves mention. Today the confidence which that patient waiting evidences is justified in handsome measure. Our compliments to the Grand Rapids Railway, General Manager DeLamarter and the people of Grand Rapids!

PRESS COMMENT VERY FLATTERING

The Grand Rapids *Press* on Wednesday, June 9, said:

> They represent a faith upon the part of the local railway in this city's future. This faith has meant the exceedingly painful experience of passed dividends and heavy capital investment. It has grown out of a conviction that we have here an ideal town for such an experiment; a city disposed to deal fairly with its utilities, and a city destined to steady growth and a lasting industrial demand for traction service. It is a faith based on the knowledge that Grand Rapids is a progressive town capable of appreciating the best and worthy of advanced utility efforts to please.
>
> To quote the ELECTRIC RAILWAY JOURNAL, "if the net result is merely to stimulate a more general effort to improve the street car as a transportation merchandising agency, Mr. DeLamarter's strenuous efforts in the face of many obstacles and some skepticism will prove of invaluable service to the industry." That is the comment of Mr. DeLamarter's own business associates. His fellow citizens would like to add that they appreciate and approve his boundless confidence in this community and its destiny.
>
> Grand Rapids' new street cars are to go into service next Saturday. They provide this city with the most luxurious electrical transportation in the United States. They represent the ultimate, to date, in street car design. But they represent something else, of more importance though of a less tangible nature.

On Monday, June 14, the Grand Rapids *Press* printed this editorial under the heading "Public Be Pleased":

> Grand Rapids turned out Saturday in circus mood for Louis DeLamarter's parade of new street car equipment. Its enthusiasm is due to appreciation of a public utility which has said: "The public be pleased" instead of "The public be damned."
>
> Mr. DeLamarter has won a deserved and increasing popularity for his service. This popularity is evidence of his alertness, his canny sense of the best commercial appeal to make to a community in the name of electric transportation. It is evidence, too, of his rare business foresight with regard to the solid industrial prospects of this city.
>
> The *Press* recently commented upon the street railway and its investment, and upon Mr. DeLamarter. It does so again, because Saturday's public turnout was in the way of a confirmation of the methods adopted and investments made. Business men, officials, employees and ordinary citizens seized the chance to see the new cars and to ride in them. Good will was the day's keynote; and good will today must be the first asset on the books of a utility competing with automobile transportation.

All in all, Grand Rapids residents are proud of their new coaches and in welcoming them seem to have reacted to the psychology that was Mr. De Lamarter's aim—an increased patronage through comfort and attraction and winning the potential rider who wants to ease his pride in a vehicle that offers the same refinements as does his own automobile.

As a beacon welcoming the arrival of modern transportation for Grand Rapids, a colossal bonfire, fed by worn-out and obsolete street cars of the past, will be built at Comstock Park west of the company's property, Thursday, June 24. In accordance with the railway's custom of burning all useless equipment, Mr. DeLamarter will destroy these ancient models and borrowed cars because they are beyond possibility of repair or reconstruction. The bonfire will be a gala occasion and many features are planned for the celebration, to which the public is invited.



Nurses from Three Hospitals Rode in One of the Coaches

Another First for Philadelphia

Daily passenger airplane service from Washington to the Sesqui-Centennial grounds will be opened by the Philadelphia Rapid Transit Company early in July. Fokker monoplanes will be used. The actual operating schedule has not been drawn up and the exact date on which the air line will begin operation will depend on when the ships are available for use.

The Navy Yard flying field will be placed at the disposal of the P.R.T. air line and a government field will be used at the capital. Technical operation of the monoplanes will be under the direction of Anthony H. G. Fokker, designer of the ships. He will also select the pilots. The line will be financed by the P.R.T. No indication has been given of the rate between the two cities.

Mayor Kendrick made the announcement about the new service. He said:

> This interesting and constructive plan of the P.R.T. means another "first" for Philadelphia. Establishment of commercial aviation between the cities of Philadelphia and Washington under the capable management of Mr. Fokker indicates that Philadelphia will assume leadership in this important method of transportation.
>
> It is indeed a contribution to the Sesqui-Centennial to have commercial air service started during the celebration.

The strides taken in commercial aviation in Europe greatly impressed Mr. Mitten, the P.R.T. head. Mr. Mitten said:

> The safety of commercial aviation is today an accepted fact in Europe. The air lines there have an enviable safety record. The London-Paris service in 1925 carried almost 20,000 passengers without serious accident. My personal observation upon the flying field was that airplanes are used very generally by business men, and that elderly ladies, who a few years ago would have been found knitting by the fireside, now gleefully and confidently use the air service.
>
> Ascertaining by cable that Mr. Fokker could and would build the necessary number of planes in the time allowed and would undertake the responsibility of supplying a safe and satisfactory service, I agreed to support a daily airplane passenger service between Philadelphia and Washington during the Sesqui, subject only to our receiving the co-operation of the government.
>
> Fokker three-engine monoplanes, equipped to carry ten passengers each, will be used in this service. Selection and supervision of the flying force will be under Mr. Fokker's personal direction. Wright air-cooled engines will be used in these planes, which embody the latest features of Fokker construction and flying qualities, non-stalling, non-spinning, and with perfect control at all speeds. They are actually safer than the Fokker planes which are now flying almost 10,000 miles a day on regular commercial air lines abroad.

New Power Contract Contemplated in Kansas City

B. J. Denman, vice-president of the United Light & Power Company, the holding organization of the Kansas City Power & Light Company, will continue conferences in connection with the projected purchasing of power from his company by the Kansas City Railways when it is reorganized.

The power plant of the railway is not as efficient as that of the Kansas City Power & Light Company and the railway reorganizers estimate that $1,500,000 would be necessary to put the plant upon an efficient basis. The light company, it is said, is able to furnish electric power to the railway at three-quarters of a cent per kilowatt-hour.

If these arrangements for power for the railway are completed, it is said that negotiations will include provision for the sale of the railway's power plant to the light company, by which it will be retained to handle peak loads and emergencies.

Apparently, the hydro-electric power project now under way on the Osage River is not to be considered at this time by the local organizations.

New Transportation Program at Columbia

A program adopted by the City Council of Columbia, S. C., provides that cars of the Columbia Railway, Gas & Electric Company are to be operated only on such lines as are profitable; zones, with 5-cent fares and no transfers are abolished, a straight 10-cent fare being charged, and additional buses are to be operated by the Carolina Transit Company to serve communities from which trolley service is withdrawn. Under the arrangement, transfers are to be provided, without additional charge, from the street cars to the bus lines and vice versa. The buses and street cars are operated by separate and independent companies.

The omnipresent jitney, regarded by many as the real disturbing factor in the transportation problem, is also handled in the program adopted by City Council.

A joint committee, composed of members of the South Carolina Railroad Commission and the City Commission of Columbia, in its report to the City Council said:

> We particularly desire to impress upon you our belief that neither the street car company nor the bus company can long survive jitney competition unless they (jitneys) are regulated in the city of Columbia.

And so the jitneys, carrying passengers anywhere in the city limits at 10 cents a head, operating on no regular schedule, are to be required to provide a $250 surety bond. This ruling, it is believed, will rapidly drive the jitney out of business, as most of the drivers will not care to supply that bond. With the free lance jitneys out of the running, the bus company and the railway, both of which are reported to be suffering from lack of nourishment now due to jitney competition, will have everything their own way and the citizens hope they will be able to make tongue and buckle meet.

The transportation problem has been much in the public eye in Columbia for several months. The general public has been singularly apathetic and indifferent with regard to it. The buses came, and while there was some hullaballoo, no very great row was made. The jitneys with 10-cent fares, the buses with 10-cent fares and the trolley cars with 5-cent fares (and a zone system) all struggled along and the wonder grew that all could continue to operate. The jitney drivers changed frequently, but the machines were kept in service somehow and hundreds of people favored them in that they carried the passengers direct to their homes. Now, however, it is believed that the jitney will be driven from the field and that buses will replace street cars on all except a few of the streets.

Essentials of New York Bus Situation Grasped by Wall Street Journal

ALREADY Mayor Walker has rather frankly indicated his acceptance of the view that surface lines on Manhattan island obstruct traffic and should be removed. That is, of course, not the only question involved in Mr. Craig's proposals. Even an affirmative answer on that point does not necessarily confirm the wisdom of buying the Fourth and Madison, the Eighth and the Ninth Avenue lines for $7,000,000. Equally important questions are: Whether the owners of these lines have anything to sell the city that is worth the price asked; whether surface transit lengthwise of the island should be motorized; whether any engineering study of the advantages of buses compared, not with antiquated surface cars now feebly operated but with modern electric cars adequately maintained and competently run, has been made on the public behalf.

If, as the Mayor appears to believe and as is sufficiently obvious in other ways, the city could have no purpose in buying these lines except to wipe them off the streets, the real nature of the transaction would be to pay $7,000,000 or some other sum to terminate the franchises involved. If their owners cannot make them pay, what are the franchises under which they were built worth? A franchise which has become only a permission to lose money in the city streets cannot have any value.

Mr. Craig's explanation that most of the persons interested in these lines are well along in life and do not care to "deplete their estates" by investing in new equipment has no application to at least one of the properties. He and his associates acquired the Fourth and Madison Avenue line within recent weeks from the New York & Harlem Railroad, a corporation amply able to finance rehabilitation of its surface line if its management saw any promise of adequate profits ahead. As to the others, aged persons who are not looking for a hazard of new fortunes can always find a market for a property which needs only young blood and capital to revive its prosperity.—*Wall Street Journal.*

Terms of New Agreement Discussed at Tacoma

With an agreement from the start that both sides shall "lay all their cards face up on the table" negotiations have been undertaken between the new City Council and the Tacoma Railway & Power Company, Tacoma, Wash., for a settlement of the car problem. The new Mayor, Melvin G. Tennent, who replaced Mayor Fawcett, the sworn enemy of the transportation company, presided at the first conference. He announced as the aim of the City Council "the lowest possible fare consistent with good service for all the city and fair treatment of the company." He suggested that the company should allow the city's representatives to assist in working out any economies of operation. One such means of economy suggested is the stopping of cars at every third block in the residence sections.

Among the preliminary matters disposed of at the first conference was the commitment of the Council to inclusion of an interchange of transfers between the Tacoma Railway & Power Company's cars and those of the municipal belt line on the tideflats, service to outlying sections and convenient sale of any tokens or passes agreed upon as necessary parts of any settlement.

Statement by the company of the lowest valuation upon its properties which it will feel justified in accepting as a basis of computation of a fair return was agreed upon as the foundation upon which actual arbitration of terms must rest. It was agreed that 6 per cent would be taken as a tentative rate of return to use in computations.

An important understanding proposed by Mayor Tennent and agreed upon was that no conversations or conferences upon the transportation problem should be held by individuals of opposite sides of the conference body, but that whatever was done would be done by the body as a whole.

New Tentative Ordinance for Louisville

A tentative ordinance has been placed in the hands of Mayor A. A. Will by the Louisville Railway, Louisville, Ky., providing for a straight 7-cent fare and a 10-cent combination bus and railway fare, with transfers.

According to the proposed plan, bus lines would be used for extension of suburban service, and one or more of the more important street car lines would be extended. The ordinance would make a 7-cent fare the basic fare and arrange for increasing this fare, if conditions and earnings warranted it. It would remove regulation of the company from the hands of the Board of Public Works. Rate changes would be acted upon by the General Council, and would not be automatically controlled by a barometer fund as at present. Properties of the company would be appraised by the city and company and a valuation established, with earnings regulated through fares to guarantee a reasonable return on investment. The new regulations, it was stated, were based on the transportation act of 1920, with such changes as needed to fit local conditions. Under the new plan the standard bus fare would prevail on combination bus and street car trips. School teachers and pupils would be carried at half fare and policemen, firemen and park guards would ride free when in uniform.

Under the present regulations there is a 7-cent fare, but under a sliding scale, in which a barometer fund establishes the rate, at either 6 or 7 cents. There are no transfers from cars to bus. The buses are operated by the Kentucky Carriers, Inc., a subsidiary of the Louisville Railway, and the cash bus fare is 15 cents, with four tickets for 50 cents.

Des Moines Residents Enjoy Riding All Day for Quarter

The Des Moines City Railway, Des Moines, Iowa., sold 5,484 passes on its intial "all-day-for-a-quarter" Sunday plan and passengers traveled 37,131 times on these tickets, which were good from 5 a.m. Sunday to 5 a.m. Monday. The regular fare is 10 cents. Car riders on the try-out day averaged nearly seven rides for each ticket.

Des Moines is the third city in the country to give a try-out to the plan intended to boost traffic on what is ordinarily the lightest day of the week. The proposed installation of the plan was mentioned in the ELECTRIC RAILWAY JOURNAL issue of June 5, page 989. Pittsburgh initiated the plan and it has been tried in Wheeling, W. Va.

Oil-Electrics for Freight Movement in Rochester

Freight lines on the new industrial railway built by the city of Rochester, N. Y., in the bed of the abandoned Erie Canal through the heart of the city will be operated by oil-electric locomotives.

This was revealed when bids were opened by the City Board of Contract and Supply on electrification of the road from Brighton, on the eastern limits of the line, to the Barge Canal on the west. The specifications, as revised, call for electrification of two passenger tracks and operation of freight lines by oil-electric engines. By this move 4 miles of electrification were saved, city officials asserted.

It is expected that the subway will be in operation in the fall. The tracks are laid, stations and bridges completed and only the electrification work is to be finished. The operator of the railroad has not been decided upon. That matter is still in the hands of a committee of citizens appointed by Mayor Clarence D. Van Zandt, "the father of the subway." It is deemed improbable that the city will attempt to operate the system. Rather it is thought that some operator, most probably the New York State Railways, which has the needed equipment, will lease the subway railroad. The line will carry passengers from the outskirts, take care of all interurban lines entering the city and serve industry by freight hauling and switching.

"The Shartel Monuments"

Some idea of the high regard in which John W. Shartel, the late president and receiver of the Oklahoma Railway, Oklahoma City, Okla., was held by his subordinates and associates is shown in the tribute to him in the *Oklahoma Railwayan*, the official paper of the company.

Through this vehicle George G. Barnes, who worked with Mr. Shartel in legal undertakings for many years, expresses what he thought of the man who 30 years ago went to Oklahoma and not only dreamed his dreams but made them come true. Another tribute, signed "M.W." is entitled "The Shartel Monuments," wherein it is hoped that Mr. Shartel with phantom fingers will direct the street cars, still "showering the wealth of his great genius upon them even in death."

It was said that, to his intimate friends, Mr. Shartel expressed the desire to retire from the active management of the Oklahoma properties and devote the major part of his time to the writing of histories of the American Revolution and the war of the states. The tremendous difficulties which faced the company, however, delayed his retirement, and at the time of his death he was but awaiting the moment to withdraw.

Rights Under Indeterminate Permit Fixed in Indiana

When a public utility surrenders its franchise with a municipality and takes an indeterminate permit from the Indiana Public Service Commission, all the rights, powers and duties which existed under the franchise in favor of either party to the franchise are abrogated. The Indiana Supreme Court has so ruled. The case arose in South Bend, where the Chicago, Lake Shore & South Bend Railway, an interurban line now known as the Chicago, South Shore & South Bend Railway, had a provision in its franchise with the city of South Bend which permitted it to run a track in La Salle Avenue, one of the principal streets of the city. One clause of the franchise, however, restricted the company from handling freight in this street except as might be provided by city ordinance.

A few years ago construction work was started on some large buildings in this street and the company was asked by the contractor to haul material to and from the scene of construction. City officials did not object and the company agreed. Property owners, however, brought injunction proceedings. They won the case in the Superior Court. Between the time of the filing of the suit and the trial of the case the company surrendered its franchise and took out a permit from the Public Service Commission. Attorneys of the company took the position that the surrender of the franchise abrogated all restrictions and the company was at liberty to operate freight trains under the 1920 law, which gives interurbans that right.

The property owners contended that the surrender of the franchise affected only such matters as fares, charges and character of service.

Aldermen Pass Richmond Franchise Over Veto

The Board of Aldermen of Richmond, Va., has overridden Mayor Bright's veto. On June 15 it passed the blanket franchise sought by the Virginia Electric & Power Company by a vote of nine to three. Eight votes were necessary for passage. The Common Council had previously overridden his veto. Sale of the franchise will be advertised for four consecutive weeks, after which the Council will examine bids.

Members of the board were supplied with a statement showing the per cent of tax charged on gross receipts on traction business in other cities. According to this statement, Baltimore was the only city showing a greater rate than 3 per cent. The present rate in Richmond is 6¼ per cent. The Virginia Electric & Power Company sought a 3 per cent tax. Five per cent for the first year, to be graduated downward over a period of ten years until it was 3 per cent, to remain for the next twenty years (the life of the franchise being 30 years), was agreed upon as a compromise. The Mayor wanted the tax to remain at 6¼ per cent. It was for this reason he vetoed the measure.

The terms of the proposed new grant have long been the subject of discussion and negotiation.

Safety Talks for School Children

Conductor S. J. Steele and Operator J. E. Watson of the railway department of the Georgia Railway & Power Company, Atlanta, Ga., were asked by Principal J. H. Smith of the William A. Bass Junior High School to speak to the students on "Safety" as part of the school's program for "Safety Week." Mr. Steele warned the students always to go to the right-hand curb after alighting from a street car and never to hold to the side of a street car while riding a bicycle or roller skating. Mr. Watson, who operates a one-man safety car, illustrated his talk with a number of examples of how stopping the street car has many times saved people from injury after their own carelessness has placed them in danger.

Talks by operators and conductors before school children, according to officials of the company, open an entirely new line of attack upon the problem of safety on the streets, and men in the employ of the company will be encouraged to make such talks when the demand for them arises.

Court Dismisses Suit Against Philadelphia Rapid Transit

Judge Dickinson in the United States District Court on June 8 dismissed the suit of Daniel J. Furey against the Philadelphia Rapid Transit Company, in which he asked the court to order a refund of approximately $57,000,000, alleged to have been collected in excess of a 5-cent fare. The court declared that Furey had no cause for action in the matter because the State Supreme Court had passed on the constitutionality of the Public Service Commission act and other points brought out by Furey in his case.

News Notes

Sesqui Edition of "Traveler."—The Philadelphia Rapid Transit Company, Philadelphia, Pa., has issued a Sesqui-Centennial edition of its "Traveler," a guide book with a description of all the city's transit facilities. The new edition carries the cover designed by John J. Gough, to whom a $500 prize was awarded on May 1. A feature of the book is a map 17 in. x 28 in. showing trolley and bus routes throughout the city.

Plea for Continued Freight Rates Heard.—Hearing on the petition of the Salt Lake & Utah Railroad, Salt Lake City, Utah, for the maintenance of transcontinental rates on westbound shipments and the establishment of such rates on eastbound shipments of freight was commenced recently in Salt Lake City before Examiner W. A. Hill of the Interstate Commerce Commission. The Salt Lake & Utah, which is also known as the Orem line, has enjoyed the privilege of giving transcontinental rates on westbound shipments which it hauls in connection with the transcontinental railroads, and recently applied to the commission for the right to establish the same rates on eastbound shipments. This causes the Union Pacific to apply to the commission for a cancellation of all rights on the part of the local railroad to charge transcontinental rates. The petition of the Orem line now being heard, therefore, asks the commission that the plea of the Union Pacific be not granted, and in addition that the eastbound through rates, not heretofore enjoyed, be established.

Fare Collecting Changes.—The Philadelphia Rapid Transit Company, Philadelphia, Pa., will install a new system of fare collection on routes 11 and 34, eastbound cars, beginning June 20. The innovation will allow the company to operate one-man cars on these routes. Passengers on these routes will pay fares to conductors if they leave the car before it enters the subway. If they ride into the subway, they pay their fares to cashiers at stations after they leave the car. Automatic turnstiles are being installed for this purpose.

Higher Fare May Be Sought in Sandusky.—It is said that the Lake Shore Electric Railway of Cleveland gave notice to the City Commission of Sandusky, Ohio, that it intends to present a franchise providing for a 7-cent fare instead of the present 5-cent fare on the company's city lines. The officials explained that revenue of the city lines had been failing to meet operating expenses. The 25-year franchise, under which the company has been operating city cars in Sandusky, expires in July.

Order Affects Grade Crossings.—The Public Service Commission of Pennsylvania has decided that the Scranton Railway must maintain watchmen at all grade crossings in the city and vicinity where one-man cars are operated. In addition the company must also have one-man cars come to a stop within 15 ft. of each crossing in order that the motorman-conductor can satisfy himself as to the safety of proceeding. When the Scranton Railway, some months ago, applied to the commission for the modification of the law compelling the placing of watchmen at grade crossings, former City Solicitor P. V. Mattes filed a petition on behalf of the city protesting against the request. A hearing was held before the commission, at which time City Solicitor C. B. Little presented arguments on behalf of the city. The commission ordered an investigation by its own engineers, with the result that the stand of the city was upheld.

Would Spend $15,000 on Repairs.—The Cincinnati Street Railway, Cincinnati, Ohio, has requested authority from Edgar Dow Gilman, Director of Street Railroads and Motor Buses, to spend $15,000 in making repairs on the Fairview incline, which has been closed down by the railway. Pending action of the director, the railway has rerouted its College Hill cars in order to give the residents of Clifton Heights and Fairview, ordinarily served by the incline, adequate car service. In the event the new rearrangement proves satisfactory, it is likely that Mr. Gilman will authorize the abandonment of the incline instead of making the necessary repairs.

Hearing on Electrification Deferred.—At the request of William A. Jones counsel for the Richmond Hill Board of Trade, the Transit Commission has adjourned until Oct. 15 the hearing on the application of the board and other petitioners for the electrification of the Glendale cut-off of the Montauk Division of the Long Island Railroad. Mr. Jones said that it would be difficult to produce witnesses during the summer, as so many persons interested in the matter would be away.

Hearing on Fare Application Delayed.—Ignoring the protest of the United Traction Company, Chairman Pendergast of the Public Service Commission recently granted the request of the city of Albany, N. Y., for a delay of two months in hearing the application of the company for an increase in fare. The commission at the same time promised a speedy decision on the contention of the city of Troy that a franchise binds the company to a 5-cent fare on its lines in that city.

Freight Car Contract Approved.—No opposition appeared when the Massachusetts Department of Public Utilities gave a hearing on the application of the Boston Elevated Railway, Boston, Mass., for the approval of a contract with the Boston & Worcester Street Railway for operating freight cars of the latter company over lines of the "L" in Boston. The new contract is a revision of the contract in force between the two companies since 1912. The chief changes in the new contract are in the rate increase for power used and a provision for operating cars by employees of the Boston & Worcester instead of "L" carmen as at present. The use of Boston & Worcester employees in operating its cars means a substantial saving to the latter company, as wages of the Boston & Worcester employees are lower than those of the elevated employees.

Recent Bus Developments

Dates Fixed for I.C.C. Bus Hearings

A schedule of thirteen hearings in cities from coast to coast was announced by the Interstate Commerce Commission on June 16 in connection with an exhaustive investigation of motor truck and motor bus operation by and for and in competition with the railroads.

The hearings will begin at Chicago July 27 before Commissioner Esch and Examiner Flynn and will be closed in Washington on Sept. 29. All parties in New York with an interest in the matter will be heard at a session to be held in the Merchants' Association Rooms, 233 Broadway, on Sept. 10. The schedule of hearings follows:

Chicago, July 27; St. Paul, July 30; Portland, Ore., Aug. 7; San Francisco, Aug. 12; Los Angeles, Aug. 17; Denver, Aug. 25; Detroit, Sept. 1; Boston, Sept. 8; New York, Sept. 10; Dallas, Sept. 20; Kansas City, Sept. 24; Washington, D. C., Sept. 29.

In a session ordering the hearings the committee prepared a detailed questionnaire which must be answered by every common carrier subject to the Interstate Commerce laws requiring information as to all motor operations by them, by subsidiaries or by competitors.

The questionnaire will not go to the so-called independent motor bus and motor truck operators. It was learned, however, that the independent operators will come in as parties at interest through various state and national organizations and arrangements have been made by the commission to give them a full hearing.

Under the present arrangement the railroads will be heard first, then the operators of buses or motor trucks and then other interested parties, including representatives of shippers and state or municipal utility commissions.

Independent Bus Rights Lost in Tacoma

In connection with negotiations opened with the Tacoma Railway & Power Company, Tacoma, Wash., for a settlement of the transportation problem of the city, Mayor Tennent has stated that the Council considered that when the Puget Transportation Company, to which bus permits had been granted, discontinued service several months ago, it canceled its permits and the Council would not risk further complications with renewed service just at this time. The Mayor said, however, that if the negotiations with the railway did not work out favorably, the city might again resort to the bus for service. City attorney Murray expressed the opinion that there was no question of the right of the Council to declare the permits void by reason of discontinuance of service, but that a resolution would have to be adopted setting forth the grounds for cancellation and fixing a date for a hearing at which the company should have an opportunity to defend itself. Permits issued last year to the Puget Transportation Company for twelve buses on the Point Defiance line have already been revoked, and the bus company has been admonished not to start regular service under the old permits, a course it had threatened to pursue.

Blanket Bus Permit Denied by Ohio Court

The Supreme Court of Ohio on May 27 reversed a decision of the Public Utilities Commission granting franchises over irregular routes to the Buckeye Special Transit Company. Some sixteen existing transportation companies, both steam and electric, had appealed from the decision of the commission and that brought the case before the Supreme Court.

The refusal to grant the franchises requested by the Buckeye company was based on three grounds. For one thing the company had not followed the rule which required the application to be advertised for three weeks in a newspaper of general circulation published at the county seat of each county in the state in or through which the applicant proposed to operate. Practically, of course, this would have meant an advertisement of the application in each of the 88 counties of the state.

The second ground for the reversal of the regulation was that the company had not shown that the regular lines of transportation service were not furnishing reasonable facilities.

The third ground was that casual and unusual service such as heretofore has been rendered under private contract is not the proper subject matter of a certificate of public convenience and necessity. The court says:

> The whole subject of public motor transportation is new, and it is not surprising that the legislation on this subject has failed to meet all of the problems presented.

It is also quite certain that further legislation will be required definitely to authorize the commission to grant such wholesale service without compliance with all the requirements of notice and statement and of proof of necessity and convenience applicable to smaller and regular operators.

Excursions by Bus by Interstate

The Interstate Public Service Company has arranged to run a series of excursions by bus to all of the state parks and to other points of interest in Indiana. The first excursion was set for June 6 from Indianapolis to Brown County by the way of Franklin and Columbus and returning by the way of Bloomington and Martinsville. The trip was planned so as to give those taking it four hours in Brown County. The excursions will be conducted personally by representatives of the Interstate.

Party Business Profitable in Kansas City

According to a statement credited to Francis M. Wilson, one of the receivers of the Kansas City Railways, Kansas City, Mo., the use of the bus in that city has increased to a marked degree since the advent of hot weather. This increase has been noticeable both in the patronage of the regular schedule routes and in the business of chartering buses for special hire, started by the receivers some time ago.

The receivers have found the special charter and party business a very profitable phase of bus transportation and have made every effort in recent months to increase this class of patronage by large parties at night after rush hours on the regular lines is over.

Mr. Wilson also said the receivers have found it difficult to determine the source of bus patronage, but he estimates that about 60 per cent of the bus revenue represents a loss in street car patronage.

According to the statement, the loss of about $20,000 a month on the buses is attributed to the use of pneumatic tires and to the fact that buses in Kansas City are not allowed to carry standing passengers. Tires are said to cost the company 3.8 cents per mile, and Mr. Wilson estimated that the use of solid tires would cut this expense to less than 1 cent per mile. He also said the buses would carry nearly twice the number of passengers now carried, if passengers were permitted to stand.

According to F. G. Buffe, general manager for the receivers, the Kansas City Railways' bus system is being operated as cheaply as are similar services in other cities, despite the fact that in Kansas City no line has a grade of less than 5 per cent to travel while on some of the routes the grade is as much as 13 per cent.

The buses are leased to special parties at the rate of $7.50 an hour, with special rates effective where intervals of waiting are required. The demand for this class of service is growing rapidly among clubs, conventions, societies, etc., for special trips of all kinds. The receivers have frequent calls to meet special parties at the Union Station to take visitors for a tour of the city or on other trips.

No Action on Chicago Bus Offer

Pending the outcome of an investigation by the Cook County Board of Commissioners no action has been taken on the standing offer of the Chicago Motor Coach Company to operate buses from points where street car lines and steam railroads touch the public forest preserves of Cook County to various picnic, swimming and scenic spots now inaccessible to all but the private autobilist. The motor coach company desires to establish this service in advance of the International Eucharistic Congress, which will bring hundreds of thousands of visitors to this section from all parts of the world on June 20. Inasmuch as the service proposed will be furnished on Saturday afternoons, Sundays and holidays only, there is a possibility that the city of Chicago will agree to subsidize the lines.

Receiver Sought for Ohio Bus Line

The Red Star Company, a bus line which some months ago disposed of its rights between Springfield and Dayton to the bus subsidiary of the Indiana, Columbus & Eastern Traction Company, now proposes, it is said, to do likewise with its Springfield-Columbus franchise. Suit asking for the appointment of a receiver was filed in the Clark County Common Pleas Court recently.

The plaintiff avers that the Red Star Company is indebted to him in the sum of $1,028, representing unpaid premiums on insurance policies. He declares that a deal is pending whereby the "sole assets of the company," namely, certificates of conveyance issued to the company by the Ohio Public Utilities Commission, are to be transferred to the Columbus & Springfield Transportation Company. All other property used by the lines is held in the names of individuals, the plaintiff said. He asks for an injunction to restrain the company from disposing of the conveyance certificates until his suit has been heard.

No Action on New York Bus Proposals

At a conference of the members of the Board of Estimate of New York on June 15, it was decided to have an analysis made of each application for the right to run buses in the city. These analyses will be made by the Board of Transportation and the Bureau of Franchises of the Board of Estimate and it is expected that they will be ready by July 1. As soon as these reports are completed the board will be reconvened in a closed session on the call of Mayor Walker to resume consideration of the bus situation. It was said on excellent authority that the award of a franchise or franchises would probably not be delayed long after that.

Mayor Walker is understood to favor a city-wide system to be operated by one company, if terms can be obtained in that way which will be as advantageous to the city as would be the award of a franchise for each borough.

Another phase of the bus situation will be considered on July 22 when the Board of Estimate will hold its hearing upon the proposal of former Comptroller Charles L. Craig for the city to buy the Fourth and Madison Avenue, Eighth Avenue and Ninth Avenue surface lines to clear those streets for bus routes.

Mayor Wants Independent Buses in Buffalo

Mayor Frank X. Schwab of Buffalo, who has been in Europe two months studying bus transportation, has returned to Buffalo with a proposal to license the operation of independent bus lines over various streets of the city in competition with the International Bus Corporation, a subsidiary of the International Railway. Mayor Schwab says a transportation emergency exists in Buffalo and he is willing to have the city purchase at least 50 buses immediately.

The City Council was informed by the Mayor that he was opposed to granting additional bus franchises to the International Bus Corporation in view of the public statement of Bernard J. Yungbluth, president of the railway and bus companies, that the corporation lacked funds with which to finance improvements to its system as ordered by the Public Service Commission.

The Mayor's opposition to the bus plan of the International Railway is not unexpected. Last summer he sponsored the Ernest M. Howe 5-cent bus plan. This proposal collapsed when the company headed by Mr. Howe was unable to get financial assistance.

Application of the company for permits to operate additional bus lines in Buffalo, was held up by the City Council pending the return to Buffalo of Mayor Schwab from Europe. Voters demanded a referendum on the proposed franchises when it was apparent the Council would approve the permits in Mayor Schwab's absence. In view of widespread opposition to the new permits, it was apparent the voters would defeat the franchises.

Bus Terminal Extended.—The Public Service Commission on June 11 authorized the Mid-State Coach Lines, Inc., to extend its authorized terminal for its Oswego city bus route from East Tenth and Church Streets to the city line on the Hall Road, a distance of about 1 mile.

Company Must Keep to Agreement.—The City Council of Marlboro, Mass., has threatened to revoke the bus license of the Boston & Worcester Street Railway to operate buses in the city if the prediction of a group of Marlboro employees that they may be dropped from the company payroll is correct. The city has an agreement with the road whereby it will retain all Marlboro residents employed at the time the company put buses on instead of trolley cars for passenger service.

Will Abandon Part of Bus Line.—A petition seeking authority to abandon the operation of that part of its bus line between Fort Wayne, Ind., and the Indiana-Ohio line has been filed with the Indiana Public Service Commission by the Fort Wayne, Van Wert & Lima Traction Company, through its receiver, Henry C. Paul. The bus line in question is part of the line operating between Fort Wayne and Lima. The petition alleges that revenues of the first four months of this year were far less than operating expenses.

Bus Route in Auburn Extended.—The Public Service Commission on June 11 granted the petition of the Mid-State Coach Lines, Inc., for permission to extend its route in the city of Auburn by operating over the route formerly served by the North Street line of the Auburn & Syracuse Electric Railway. The commission denied the petition for a certificate authorizing bus operation over practically the same route now used by the local trolley line. It was stated at the hearing that the company did not propose to start operation over this line immediately, and permission to abandon the trolley line has never been asked.

Competitor for Schenectady Railway.—Application for the operation of a bus line which would come into direct competition with the Schenectady Railway, giving interurban service between Albany and Schenectady, was made recently by William G. Schultz, Lathams, who asks for a certificate to operate one 25-passenger bus between Albany and Schenectady under the name of the Albany, Colonie & Schenectady Bus Line. It is proposed to make four round trips a day and add other buses as the demand warrants. The Albany Common Council recently passed an ordinance giving the necessary local consent.

Bus Permits Allowed.—The Illinois Power & Light Corporation has been granted formal permit by the Illinois Commerce Commission to operate buses on several Bloomington and Normal, Ill., streets and to establish a line between the two cities.

Bus Report Satisfactory.—It is announced that earnings of two buses placed in operation on June 2 over a new route by the Evanston Bus Company, a subsidiary of the Evanston Railway, are already more than equaling operating expenses.

Must Conform to Paving Rules.—The proposed plan of the Madison Railways to abandon its Harrison Street car line and substitute bus service along Regent Street met with a setback when the Common Council adopted the recommendation of its special street railway committee which requires the company to bring its tracks up to grade and make other repairs to its right-of-way in conjunction with the city's new paving work on Harrison Street between Monroe Street and Keyes Avenue.

Buses Between Omaha and Papillion. The Omaha & Lincoln Railway & Light Company, Ralston, Neb., has been authorized by the Nebraska State Railway Commission to abandon car service between Omaha and Papillion and substitute buses. The company was out of pocket $3,548 last year in operating the lines. Morning and evening a car will be run as far as Ralston, halfway to Papillion in order to keep the franchise alive. The rest of the tracks will be taken up.

Bus Franchise Granted.—The town of Easthampton, Mass., has granted a franchise to the Boston & Maine Transportation Company to run buses between Easthampton and Mount Tom Junction, to take the place of the passenger service hitherto maintained by the Boston & Maine on the branch line between these points.

Bus Extensions in Rochester.—The Rochester Co-ordinated Bus Lines, Inc., subsidiary of the New York State Railways added two lines on June 14 to its rapidly growing bus system. Service was begun on the Emerson Street extension and the Glide Street routes, both feeder lines, to serve the extreme western border of the city. The Emerson line will be extended to connect with two trolley lines. Both of these lines serve growing factory and residential districts. A half-hour running schedule will be maintained, and as traffic warrants, the schedule will be increased and equipment added.

Financial and Corporate

Foreclosure Sale Confirmed

Way to Reorganization Cleared by Federal Judge in Approving Kansas City Purchase Action

Final objections to the reorganization plan of the Kansas City Railways, Kansas City, Mo., were ruled out by Judge Kimbrough Stone on June 15 in closing the hearing on the decree confirming the sale of the property to the Kansas City Public Service Company. The court indicated that formal confirmation of the order would be made during the week ended June 19.

Actual possession of the property will not pass to the new owners until the fall. It is estimated that all the cumbersome preliminaries to the transfer cannot be accomplished in less than 60 or 90 days. The property is to be paid for by turning in first mortgage bonds. While these bonds largely have been assembled in depositories in larger cities, there are some 40,000 separate bonds. Their careful handling, checking and recording will be a matter of weeks.

After John T. Harding, special master commissioner, takes over the funds in the receivers' treasury and makes the necessary disbursements, including various allowances, the new purchasers of the property are allowed 30 days to assemble and transport the bonds to Kansas City. Mr. Harding has been granted two months in which to check these before issuing a deed to the Kansas City Public Service Company.

Compensation to the receivers and other parties who have served directly or indirectly as officers of the court in connection with the receivership will be made the subject of a special order, expected to be signed within a few days.

Five Kansas City business men, including R. A. Long, chairman of the board of the Long Bell Lumber Company, testified before the court on June 14, estimating the value of the receivers' services at from $50,000 to $75,000 a year apiece. Receivers Fred W. Fleming and Francis M. Wilson, F. G. Buffe, general manager, and several department heads testified regarding the accomplishments of the receivership. Each receiver has been paid to date $115,000. Their services now are in the ninth month of the sixth year.

On June 14 the Continental & Commercial Trust & Savings Bank, Chicago, trustee under the first mortgage, asked $35,000 as a fee for services it had rendered. The fee applied for in behalf of R. J. Higgins, counsel for the first mortgage trustees, was also $35,000. The firm of Mayer, Meyer, Austrian & Platt, attorneys for the first mortgage bondholders, asked a fee for a similar sum. The fee for services of both receivers, of James E. Goodrich, counsel for receivers, Charles L. Carr, assistant to Judge Goodrich, and others to whom final allowances will be made have been left to the discretion of the court.

The decree confirming the sale of the railway to Kansas City Public Service Company was signed by Judge Stone late Wednesday. Allowances were made as follows: To receivers, $71,000 each in addition to amount already paid; to Judge Goodrich, $59,000 in addition to amount already paid; to C. L. Carr, $3,000; to Continental Bank, $5,000; to Mayer & Platt, $35,000; to R. J. Higgins, $35,000; to John Harding, $6,500 in addition to amount already paid; to E. F. Swinney, $10,000; to William G. Holt, attorney for the Armour interests, $10,000; three other minor allowances.

City Moves in Rochester Valuation Case

The city of Rochester, N. Y., has made its first court move in its long-standing suit for a reappraisal of the valuation of the Rochester lines of the New York State Railways under which the present service-at-cost contract between the city and the railways was fixed.

The question submitted to Supreme Court Justice Adolph J. Rodenbeck was to determine whether by deferred action the city had not forfeited its right to ask revaluation. George Draper, assistant corporation counsel, argued for the city that action for the suit was in reality instituted within the first two years of the contract. Should Justice Rodenbeck rule that the city had acted in time, the city's fight would start in earnest, Mr. Draper said. The reappraisal would entail employment of experts at heavy cost to both sides. James F. Hamilton, president of the railway, recently made a compromise offer to obviate the necessity of a suit, but his proposal was rejected by the city.

The city contends that in the original base valuation of $19,216,000, made five years ago, the appraisers failed to make proper allowance for depreciation. The railways was willing to compromise at $1,000,500 less than this figure although Mr. Hamilton said he believed the original appraisal to be fair. His motive in making the offer, he said, was to eliminate a long and costly litigation.

Local Banks Gets Jacksonville Bonds

Consideration of bids for the $55,000 bond issue authorized to apply on the purchase price of the four new cars which have been added to the rolling stock of the Municipal Railway of South Jacksonville, Fla., was recently undertaken by the City Council. As a result the Florida South Side Bank, whose bid of $54,367.50 was the highest submitted, was awarded the issue. The bonds are of $1,000 denomination and will mature July 1, 1955. The road is run under a lease from the city which guarantees the operator against loss.

$41,175 Balance Reported by Indianapolis Street Railway

Total net earnings of the Indianapolis Street Railway, Indianapolis, Ind., for the year ended Dec. 31, 1925, less taxes were $1,116,924. This compares with $1,120,072 for the year 1924. The balance for 1925, after all deductions, was $41,175. These facts are contained in the report of the company presented at the annual meeting of the stockholders on June 9, 1926.

On account of the large decrease in revenue from city passenger fares and the transfer charge of 1 cent, shown in the report under "Earnings and Operating Expenses," it was found necessary, as a partial relief, to petition the Public Service Commission on Nov. 17, 1925, to allow a charge of 2 cents instead of 1 cent for each transfer.

After a full hearing this was granted, beginning Jan. 1, 1926. It is estimated that this increase should produce $150,000 additional revenue per annum, but thus far in 1926 the falling off in revenue passengers and the added expense of running the Broad Ripple line and operating buses have more than absorbed all of this increase.

In order to serve outlying territory and to protect itself from further en-

INCOME ACCOUNT OF THE INDIANAPOLIS STREET RAILWAY FOR YEAR ENDED DEC. 31, 1925

	Year 1925
Gross Earnings:	
Passenger receipts—city lines	$4,754,227
Transfer receipts—city lines	176,492
Track rentals interurban passenger cars	110,301
Track rentals interurban freight cars	54,675
Chartered cars	1,317
Advertising	31,020
Dog permits, etc	1,299
Rent of land and buildings, miscellaneous	27,753
Rent of terminal building and stations	236,469
Sale of power	6,910
Rent of equipment	2,045
Miscellaneous income	104
Receipts, Broad Ripple line	86,142
Bus receipts	40,966
Interest, discount, etc	6,649
Total	$5,536,369
Operating Expenses:	
Maintenance of way and structures	$631,678
Maintenance of equipment	517,988
Special maintenance, per order of Public Service Commission of Indiana	20,708
Operation of power plant	734,466
Operation of cars	1,682,517
General expense	445,464
Total	$4,032,821
Net earnings	$1,503,548
Less taxes	386,624
Total net earnings, less taxes	$1,116,924
Deductions—Bond Interest:	
Interest on $4,000,000 Citizens Street Railroad 5s	$200,000
Interest on $4,664,000 Indianapolis St. Ry. Co's. 4s	188,030
Interest on $3,635,000 Indianapolis Trac. & Term. Co's. 5s	181,919
Interest on $200,000 Broad Ripple Traction Co's. 5s	10,000
Interest on trust equipment notes	3,798
Interest on Indianapolis Car Equipment Company Preferred stock	5,450
Intercat on notes, etc	39,986
Total deductions	$629,193
Surplus (exclusive of accrued depreciation)	$487,741
Deduction from Surplus:	
Indianapolis Street Railwny sinking fund	$76,666
Indianapolis Traction & Terminal Co. sinking fund	69,900
Dividends paid on $5,000,000 preferred stock 1925	150,000
Dividends unpaid on $5,000,000 preferred atock 1925	150,000
Total deduction	$446,566
Balance	$41,175

croachments of independent bus lines the company has established seven feeder bus lines, connecting with the company's street cars at certain points, and has also put in operation three through bus lines reaching the center of the city. This service has required the purchase of 30 buses at a cost of $270,000.

There have been no quarterly dividends paid on the preferred stock of the company since June 1, 1925, on account of decreased earnings, due to the constantly increasing use of privately owned automobiles, more or less unemployment and the very serious inroads made by independent bus competition.

STATEMENT OF GROSS EARNINGS, MAINTENANCE, OPERATION AND TAXES OF THE INDIANAPOLIS STREET RAILWAY

Earnings	1925	1924
Passenger receipts—city lines	$4,754,227	$4,804,890
Transfer receipts—city lines	176,492	246,110
Miscellaneous earnings—track rentals, etc	605,649	537,175
Gross earnings	$5,536,369	$5,588,176
Maintenance of way and structures	$631,678	$631,201
Maintenance of equipment	517,988	516,272
Special maintenance expended from revenue from increased fares by order of Public Service Commission	20,708	122,910
Total maintenance	$1,170,375	$1,270,384
Operation of power plant	$734,466	$771,997
Operation of cars	1,682,517	1,616,028
General expenses	445,462	425,338
Total operating expenses	$4,032,821	$4,083,749
Net earnings	$1,503,548	$1,504,427
Less taxes	386,624	384,354
Net earnings, less taxes	$1,116,924	$1,120,072

The building owned by the company adjoining the passenger terminal station on Market Street, which was formerly used as an interurban freight house, was remodeled during the year 1925 for the accommodation of buses operated by the various interurban companies and certain other bus lines. The facilities afforded by this change have attracted nearly all of the bus lines running out of Indianapolis so that at present it is the principal bus terminal operating in the city, the only other bus terminal in the city being the small one on Kentucky Avenue, which was used by the independent bus lines when they started. It is explained that the volume of business should result in increased revenue from terminal charges and added value to the rental privileges in the Terminal Building, as well as to the rent of offices.

The company has at present 26 one-man safety cars in service. These are used on lines where travel is not heavy. Some 80 more cars will be converted for one-man operation. This will, it is expected, result in a substantial saving in operating expenses.

Original Valuation in Buffalo Holds.—The International Railway, Buffalo, N. Y., has lost its fight to have the Public Service Commission increase the valuation of its system as fixed by the commission several years ago. The company sought a higher valuation to lay the basis for a fare increase on its local lines in Buffalo. The state utilities board ruled that the original valuation must be sustained.

Lower Balance on Kansas City Interurban

While the operating results of the Kansas City, Clay County & St. Joseph Railway, Kansas City, Mo., for the year ended Dec. 31, 1925, show a decrease in business for the year as a whole, conditions changed for the better beginning about Oct. 1, and a comparison of the last three months shows an increase over a similar period for 1924 in gross revenue and net income, revealing an earned surplus in excess of dividend requirement for the three months. This was the opening statement in the annual report to the stockholders for the year ended Dec. 31, 1925.

The total number of passengers carried in 1925 was 1,660,991, against 1,936,875 in 1924. The earnings, however, will show a greater per cent of decrease due to decrease of through passengers and an increase of commuters. The passenger business shows an increase in number in October, November and December over the corresponding months in 1924. The report states that as an item of interest there were 781,945 passengers carried on the Excelsior Springs division of the electric railway during the year, or about twice the number carried on all bus lines operating over the same territory.

The Kansas City, Clay County & St. Joseph Auto Transit Company, while working in conjunction with the railway, is a separate corporation. The Auto Transit Company is operating three coach or bus lines—one between Kansas City and Excelsior Springs, a distance of about 30 miles; another between Kansas City and Parkville, a distance of about 10 miles, and a third from Kansas City via Smithville and Gower to St. Joseph, Mo., a distance of about 60 miles.

SUMMARY OF RESULTS FROM OPERATION OF THE KANSAS CITY, CLAY COUNTY & ST. JOSPEH RAILWAY, 1924 AND 1925

	1925	1924
Railway operating revenue:		
Transportation revenue St. Joseph division	$676,076	$692,929
Transportation revenue Excelsior Springs division	190,121	277,130
	$866,197	$970,060
Other operating revenue St. Joseph division	5,936	5,665
Other operating revenue Excelsior Springs division	2,282	2,154
	$8,218	$7,820
Total operating revenue	$874,415	$977,880
Railway operating expense:		
Way and structures	$91,380	$85,569
Equipment	64,249	61,866
Power	108,313	114,906
Conducting transportation	196,259	211,144
Traffic	9,496	10,157
General and miscellaneous	128,849	128,887
*Depreciation	17,324	44,645
Taxes (except income taxes)	26,182	29,837
Total	$642,055	$687,014
Operating income	$232,360	$290,866
Non-operating income:		
Interest funded securities	2,579	5,105
Interest unfunded securities	7,765	6,328
Total	$10,344	$11,433
Gross income	$242,705	$302,299
Deductions from gross income:		
Interest	160,318	161,402
Miscellaneous	3,215	3,257
Total	$163,534	$164,659
Net income	$79,170	$137,639
Less estimated income taxes	.....	5,000
Balance available for surplus and dividends	$79,170	$132,639

The auditors have taken accrued depreciation less expenditures for renewals and replacements, $42,085 for 1924 and $17,324 for 1925, as appropriations of surplus—add these amounts and minor adjustments of $137 and $41 respectively, to check their surplus net income.

40-Mile Connecticut Interurban to Quit

The Hartford & Springfield Street Railway, Warehouse Point, Conn., has been granted permission by Judge Isaac Wolfe in the Superior Court to discontinue all railway service on its lines after June 25. At the present time the company is operating an electric service between Warehouse Point and Rockville and from Warehouse Point to Hartford. Saturdays the trolleys operate on a through schedule between Hartford and Springfield. This applies to lines on the east side of the Connecticut River. On the west side there is no railway service.

Recently the railway was acquired for $10,000 by Francis B. Cooley for the bondholders at a mortgage foreclosure sale. An effort has since been made to interest new capital and effect a suitable reorganization. These negotiations are still in progress, but difficulty arose when money was sought to repair the track and overhead lines and buy new rolling stock.

Buses have been operated with success, and during the past year $100,000 was invested in this type of carrier. Inasmuch as it would cost $1,000 a mile to repair the overhead work and $30,000 to put the track in first-class condition, it was deemed advisable to adopt the bus exclusively. Moreover, it was much easier to induce new capital to promote bus transportation than to reclaime the railway.

The railway is said to have lost $10,000 during the last seven months of its operation. On the other hand the buses are said to have operated at a profit. The latter service has suffered somewhat recently through competition from the Interstate Buses Corporation and the New England Transportation Company.

H. B. Freeman, the receiver for the railway, has applied to the Connecticut Public Utilities Commission for permission to buy six additional buses to replace the trolley service.

I.T.S Men Make Record in Placing Stock

Bearing witness to the high standing of the Illinois Traction System in the communities which it serves, the 6,139 shares of 7 per cent preferred stock of the Illinois Power & Light Corporation, which controls the Illinois Traction, sold by employees of that company in a two weeks drive during May broke all records for stock selling campaigns thus far established by the company. Of the $600,000 of stock sold more than 50 per cent was placed for cash.

One of the features of the campaign, in which only about one-third of the company's employees participated, was that there was no accompanying advertising or publicity of any kind and that the sale was made by personal contact almost entirely.

Surplus for Quarter Reported in Rochester

For the first time since the New York State Railways signed a service-at-cost contract with the city of Rochester, five years ago, a quarterly report of operations shows a surplus. The report of Charles R. Barnes, Railways Commissioner, for the quarter ended Jan. 31, 1926, reveals a surplus of $56,110. One month of operation under an increased fare is covered in the report as the rate was advanced in Rochester from 7 to 8 cents on Jan. 1.

The report shows a surplus of $61,689 from railway operations and a deficit of $5,578 in bus and trackless trolley operations. The balancing account as of Jan. 31 indicates an accumulated deficit of $311,665. As the amount of fare is determined by this balancing account, city and railway officials see no immediate possibility of any return to a lower fare in the city. According to the contract, the balancing account must show a surplus of $200,000 before a fare reduction is possible.

The total number of passengers carried, including transfer and others, for each of the three months of the quarter, was as follows:

	Railway System	Trackless Trolleys	Gasoline Buses
1925 November...	7,763,174	122,700	27,780
1925 December....	8,546,717	128,999	33,741
1926 January.....	8,365,374	126,936	35,725
Total.....	24,675,265	378,635	97,246

The total number of passengers carried during the quarter on all lines operated under the service-at-cost contract, was 25,151,146.

A summary of the surplus or deficit account for the quarter follows:

	Railway Lines	Bus Lines	Total
1925 November.....	$10,959.77 deficit	$1,776.45 deficit	$12,736.22 deficit
1925 December.....	19,553.95 surplus	2,334.56 deficit	17,219.39 surplus
1926 January.....	53,095.04 surplus	1,467.75 deficit	51,627.29 surplus
Totals.....	$61,689.22 surplus	$5,578.76 deficit	$56,110.46 surplus

A comparison of passenger revenues and revenue passengers, Railway City Lines, for the month of January, 1926, under the 8-cent fare, with January, 1925, under a 7-cent fare follows:

Passenger revenues, city lines, 1926.....	$477,681
Passenger revenues, city lines, 1925.....	452,858
Increase.....	$24,823
Per cent increase.....	5.48
The change from 7 cents to 8 cents is an increase of 14.29 per cent in fare.	
Revenue passengers, city lines, 1925.....	6,693,127
Revenue passengers, city line, 1926.....	6,199,224
Decrease in revenue passengers carried.	493,903
Per cent decrease.....	7.38
The surplus for railway lines, month of January, 1925, under 7 cent fare was..	$28,851
Month of January, 1926, under 8-cent fare was.....	53,095
An increase of.....	$24,243

This approximates the increase in passenger revenues. It is pointed out that the increase on the trolley lines for January, 1926 (8-cent fare) compared with same month in 1925 (7-cent fare) was only 5.48 per cent, while the increase in fare was 14.29 per cent. This indicated decrease in the number of passengers carried might be attributed to the increased fare. There were, however, other factors which were important in bringing about this condition.

Hopeful for Reorganized Road on Long Island

The story is no longer new of how a group of Queens business men, interested in seeing local trolley service maintained between the Rockaways and Jamaica, banded together to purchase the property of the defunct Long Island Traction Company and reorganize it and revive it as the Jamaica Central Railways, but Parke A. Rowley, vice-president of the Bank of Manhattan, in charge of its Jamaica branch, did give some facts at a hearing before Chairman John F. Gilchrist and Commissioner Leon G. Godley of the Transit Commission on June 8 that shed new light on the transaction.

The hearing was upon the application of the reorganized company for permission to issue 2,000 shares of nonpar value stock and to bond itself in the sum of $140,000 to meet the cost of the purchase of the road at receiver's sale, amounting to $115,000, and for working capital. The hearing was continued by Chairman Gilchrist to permit counsel for the railroad to furnish additional figures as to the valuation of the property.

Mr. Rowley is treasurer of the company. He testified that as a banker in Jamaica he had watched with interest previous attempts to reorganize the road that did not come to fruition. He said:

> As a banker in Jamaica I was very much interested when persons came to me and told me that the continuation of the road, which operates between Jamaica and the Rockaways, was vital for the well being of a large number of persons living to the south of Jamaica. Many had bought homes along the line of the railroad. There were mortgages on some of these homes and it appeared that the owners of all of them were likely to be without any transit if the railroad stopped operation. That meant great suffering for those people; it meant a loss for those who held the mortgages on those homes.
>
> So some of us got together, I think it was just the night before the sale of the property, and arranged to buy it in with the thought we might operate it and possibly make it pay if the greatest economy were used. So we arranged for the purchase of the property and were able to get it for $115,000, although we stood ready to bid up to $150,000. We plan to operate the road with the least overhead possible with good service. The officers have agreed not to take a cent from the treasury of the company in salaries until such time as the road is firmly on its feet. We have also stipulated among ourselves that every available cent that comes in shall be put back into the road.
>
> We took over the operation of the road on April 5, and in that month we carried approximately 40 per cent more passengers than the road carried at this time last year.

New Director Chosen.—Philip Pond was recently elected a director of the New Haven & Shore Line Railway, New Haven, Conn., to succeed A. William Sperry.

Single Track Line Will Replace Double Track.—The New Jersey & Pennsylvania Traction Company, Trenton, N. J., has been granted permission to remove one of the double tracks on North Willow Street and to maintain a single track hereafter on that street.

Service Discontinued.—The Missouri Public Service Commission has entered an order authorizing the Southwest Missouri Railroad, Joplin, Mo., to discontinue its street car service from Duquesne to Duenwig in Jasper County. Three months ago the commission ordered the company to make two round-trips in the morning and in the evening for a trial period and the fare was increased from 15 to 20 cents. The record, however, showed operating losses.

Ohio Property Sold. — All property holdings of the Cleveland, Painesville & Ashtabula Electric Railway, Cleveland, Ohio, were sold for $75,000 at a receiver's sale conducted by Harry R. Collacott, chief master at the court house of Painesville, Ohio, on April 30. Frank M. Cobb Cleveland attorney, was the purchaser. The line, 24 miles long, connects at Painesville for Cleveland with the Cleveland, Painesville & Eastern Railroad, which controls it.

Vermont Roads Taken by Forshay Interests.—Interests owning the Burlington Traction Company, the Military Post Street Railway and the Vergennes Electric Company, Burlington, Vt., have announced the sale of these properties to the W. B. Forshay Company, New York. It is understood that these properties will be consolidated into one company, known as the People's Vermont Hydro-Electric Company, which in turn will be owned by the People's Light & Power Corporation, recently organized by the W. B. Forshay Company to take over, manage and operate its utilities.

Another Participation Distribution.—The voting trustees and board of directors of New York Railways Participation Corporation, New York City, have declared a second distribution on account of its assets. This distribution will be made as of July 7, 1926, and will be made in cash at the rate of $200 for each share of the stock of the Participation Corporation held.

Valuation Argument Before Court of Appeals.—The Court of Appeals of Maryland at Annapolis on June 9 heard arguments in the case involving the valuation of the property of the United Railways & Electric Company, Baltimore, by the Public Service Commission. The commission fixed $77,000,000 as the valuation of the property and in this amount was a $7,000,000 item for easements. Clarence W. Miles, who at the time of the hearing was people's counsel, opposed including any valuation for easements and took the case to the Circuit Court of Baltimore, where the Public Service Commission was upheld. The appeal to the Court of Appeals followed.

Manhattan Railway Squaring Back Dividends.—A divident of $1.48 a share on account of accumulated dividends and the regular quarterly dividend of $1.25 a share on the modified guaranteed stock of the Manhattan Railway,

New York, will be paid on July 1 to holders of record June 15. The back dividend represents 50 cents a share on account of dividends deferred because of insufficient earnings for the quarter ended Oct. 1, 1925, and of 98 cents a share for the quarter ended Jan. 1, 1926. The 50-cent payment makes up the $5 rental for the year 1925 and the 98 cents makes up the full dividend for the Jan. 1 quarter of this year when a disbursement of only 27 cents a share was made. The dividend is a charge against the earnings of the Interborough Rapid Transit Company, by which the elevated lines are operated under lease.

Fall in Net Income.—For the ten months period ended April 30,·1926, the passenger revenue of the Brooklyn City Railroad, Brooklyn, N. Y., was $9,434,013 and $9,415,703 for the ten months period ended April 30, 1925. After the consideration of income deductions the net corporate income for the ten months period ended April 30, 1926, was $1,168,801 and $1,216,667 for the ten months period ended April 30, 1925.

Change of Name Allowed.—The Danbury & Bethel Traction Company, formerly the Danbury & Bethel Street Railway, Danbury, Conn., has been authorized by the Public Utilities Commission to change its name to the Danbury Power & Transportation Company. The company plans to issue 2,000 shares of common stock of no par value, instead of the $300,000 issue of 6 per cent preferred stock. With this change in effect the capital stock of the company will be $500,000 of 6 per cent first mortgage bonds and 5,000 shares of stock without stated par value.

Gross Corporate Income $338,996.—The San Diego & Arizona Railway, San Diego, reports to the California Railroad Commission its 1925 operating revenue at $1,361,149, compared with $1,338,061 for 1924. The operating expenses, excluding taxes, for 1925 are reported at $1,041,206 and at $999,871 for 1924, leaving net operating revenue of $319,942 for 1925 and $338,189 for 1924. During 1925 taxes charged to operation amounted to $84,633 and for 1924 to $80,176. Deducting the taxes leaves operating income of $235,309 for 1925 and $258,013 for 1924. Adding to the operating income the non-operating income of the company results in a gross corporate income of $338,996 for 1925 and $342,102 for 1924.

Earnings and Traffic Increase in May.—Fewer persons used the street cars in May than the average four-year period figure of 584,922 passengers, but the operation of auxiliary bus service enabled the Madison Railways, Madison, Wis., to show another increase in earnings and passengers carried by the railway and bus systems that month. Passengers carried during May by both systems numbered 514,395, compared with 481,460 during the corresponding month of last year. In May, 1926, 469,324 passengers were carried by the street cars. Gross earnings of the cars and buses during May were $34,949, compared with $33,840 in May of last year. Of the total May earnings $31,553 was earned by the railway line, against $31,494 for the corresponding month of last year.

Personal Items

Thomas Pumfrey New Chief Engineer at Portland

Thomas Pumfrey, appointed chief engineer of the Portland Electric Power Company, Portland, Ore., will be in entire charge of maintenance of way and equipment for the city lines, buses and interurban lines. For sixteen years now the new chief engineer has had charge of the maintenance of way department, with supervision over construction and maintenance of tracks, roadways, bridges, buildings and all engineering and drafting work. In addition to those previous duties he will now have entire charge of all rolling stock.

Before he became connected with the



Thomas Pumfrey

Portland Electric Power Company Mr. Pumfrey served as chief engineer of the International Railway, Buffalo, N. Y., from 1899 to 1910. So in a period of more than 25 years Mr. Pumfrey has been connected with only two companies. But that has been a period rich with experience. He started with the International Railway just before the Pan-American Exposition and he did his bit under Thomas E. Mitten in helping to put the Buffalo property in good physical condition to handle the exposition crowds. There he served first as acting engineer of way for the company's Buffalo lines, but it was only a short time before the responsibility was made his for caring for this work on the entire system. This was no mean job considering the extent of the system at Buffalo and the diversity of service furnished, but it supplied him with a wealth of experience which he was able to apply to his work at Portland, where the railway system was somewhat similar in extent and character to that at Buffalo.

It was in August, 1910, that Mr. Pumfrey went to Oregon. His first title there was engineer of maintenance of way. At the outset the extent of his activities was circumscribed to the duties that are generally accepted as coming under that title, but as time went on the field of his operations was widened and his appointment as chief engineer was a formal recognition not only of the loyal service of the man but of his capacity for work and his engineering talent.

J. W. Carpenter Heads Dallas Railway

John W. Carpenter was elected president of the Dallas Railway, Dallas, Tex., at a meeting of the board of directors on June 12. The position of president has been vacant for some time.

C. W. Hobson resigned as chairman of the board of the railway and his resignation was accepted. He explained that since the General Electric Company has disposed of its stock in the local concern, he, as the Southwestern manager of the larger company, did not need to continue as a railway executive.

Richard Meriwether, who has been general manager of the Dallas Railway since its organization in 1917, will continue to serve in that capacity and as vice-president.

No change in the operating organization under Mr. Meriwether's management is contemplated. Mr. Carpenter's endeavor will be directed to the company's affairs to the end that the city of Dallas may have the best possible transportation service. His responsibilities as vice-president and general manager of the Texas Power & Light Company will not be affected by being identified with the Dallas Railway.

J. E. Allbritton was recently appointed assistant instructor of the transportation department of the Birmingham Electric Company, Birmingham, Ala., to co-operate with C. L. Luker, chief instructor, in training new men for train service and in improving the quality of the work of men already in the service. Mr. Allbritton has been associated with the Birmingham company since 1908.

R. L. Leach, formerly assistant superintendent of distribution of the Georgia Railway & Power Company, Atlanta, Ga., has been promoted to general stores keeper to succeed E. L. Fariss, resigned. Mr. Leach joined the forces of the Georgia company fifteen years ago. In 1916 he was transferred to the distribution department, where he became chief clerk and later assistant to the superintendent. Early this year he was transferred to the stores department.

E. L. Austin, formerly an official of the Philadelphia Rapid Transit Company, Philadelphia, Pa., was appointed director in chief of the Sesqui Exposition, Philadelphia, on June 15 to succeed the late Capt. Asher C. Baker. The appointment was made by Mayor Kendrick and will be sent to the board of directors of the Sesqui on June 21 for confirmation. Mr. Austin was formerly business manager. He was appointed comptroller of the Sesqui last June.

Manufactures and the Markets

News of and for Manufacturers—Market and Trade Conditions
A Department Open to Railways and Manufacturers
for Discussion of Manufacturing and Sales Matters

Mack Is Optimistic for Summer Months

Sale of Mack buses to traction companies during the past few weeks has been quite active, according to officials of the International Motor Company. It is the opinion of these officials that the summer season will see a considerable increase over the number of buses sold to electric railways as compared with similar business last year. The following sales were made to traction companies recently:

Public Service Transportation Company, New Jersey	5
Pittsburgh Motor Coach Company (Pittsburgh Railways)	4
Conestoga Transportation Company, (Conestoga Traction Company)	2
North Branch Bus Company (Lehigh Traction Company)	8

Bids Wanted for 100 Buses for Buffalo

Bids for the purchase of 100 buses will be asked by the city of Buffalo, N. Y., as soon as the specifications are prepared. The City Council voted unanimously to authorize Mayor Frank X. Schwab to advertise for bids after the Mayor issued an order declaring a transportation emergency exists in Buffalo due to the alleged failure of the International Railway to provide adequate service on its local lines.

The City Council also authorized the corporation counsel to inform the Public Service Commission and the International Rai way that the Mayor and the Council would not be responsible for deaths or injuries resulting from the condition of the rolling stock and trackage of the International Railway.

The action of the municipal authorities was taken in spite of the adverse decision of the city law department that the City Council is without authority to own and operate bus lines in the city, but in unanimously adopting the resolution the Mayor and members of the City Council indicated they hoped to bring the question squarely before the courts.

E. M. Herr Comments on Westinghouse Prospects

At the annual meeting of stockholders held recently in the main works of the Westinghouse Electric & Manufacturing Company, Pittsburgh, Pa., E. M. Herr, president of the company, stated that business would probably maintain a satisfactory level during the ensuing year. He went on to say:

> Business on the whole is rather b tter than was expected and is on the same basis as last year. Our company has maintained a level volume and now has a satisfactory load for its facilities. Due to seasonal conditions, we may expect a slight decrease in business during the summer months. Crop conditions in the fall will determine, to a certain degree, business conditions at that time. If crops are small bus ness w ll probably be at a lower level, although there will not be a large decrease even under adverse conditions.

At the meeting the following directors, whose terms had expired, were re-elected: F. A. Merrick, vice-president and general manager Westinghouse Electric & Manufacturing Company; R. B. Mellon, president Mellon National Bank, Pittsburgh, Pa.; George M. Gerity, president American Rolling Mill Company, Middletown, Ohio; Jerome J. Hanauer of Kuhn, Loeb & Company, New York, N. Y.

Yellow Coach to Increase Capital Stock—G.M. Absorb Fisher Body

The organization of a new $30,000,000 transportation enterprise by the Yellow Truck & Coach Manufacturing Company and backed by the General Motors Corporation, of which it is a subsidiary, was made public on June 8 by John D. Hertz, chairman of the board. In this connection it is proposed to increase the capital stock of the Yellow Truck & Coach Manufacturing Company to provide $14,000,000, of which $10,000,000 is to be made immediately available for the new enterprise. It is interesting to note that this is the first time that General Motors interests have engaged in the business of operating transportation. The new company is known as the Hertz Drivurself Corporation and will act as a holding company, controlling state and local Drivurself companies throughout the United States.

In addition to this new enterprise it was voted at a special meeting of stockholders of the Fisher Body Corporation to dissolve the corporation and to sell to the General Motors Corporation all of the assets of the Fisher Body Corporation, taking in payment 1,600,000 shares of common stock of the General Motors Corporation. Upon dissolution of the Fisher Body Corporation, this General Motors common stock will be distributed to stockholders of the Fisher Body Corporation on the basis of one share of General Motors for each 1½ shares of Fisher Body.

Haskelite Is Standard on Chicago Surface Lines

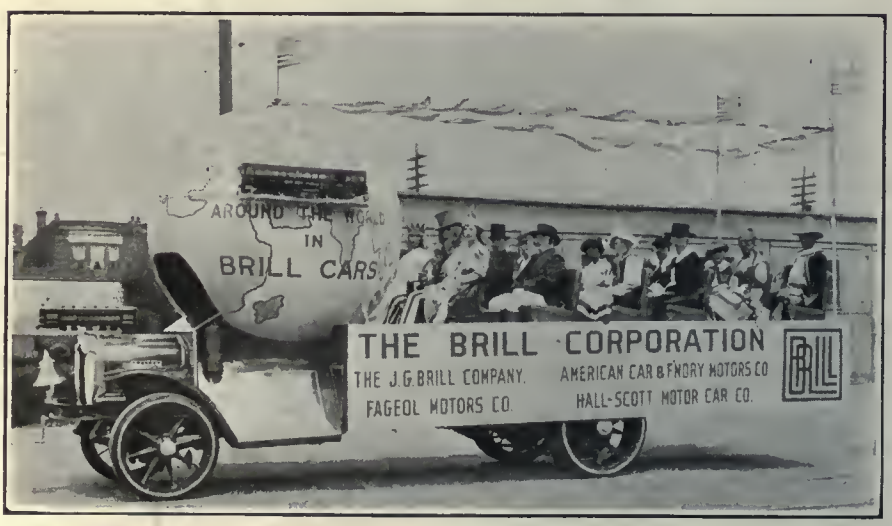
Haskelite was specified for the roofs, bulkheads and corner linings of the 100 new cars recently ordered by the Chicago Surface Lines, Chicago, Ill. Other principal specifications on these cars were published in the issue of the ELECTRIC RAILWAY JOURNAL for May 22. Haskelite has been specified as standard on the Chicago Surface Lines for the past four years.

Switching Electric Locomotives for the New York Central

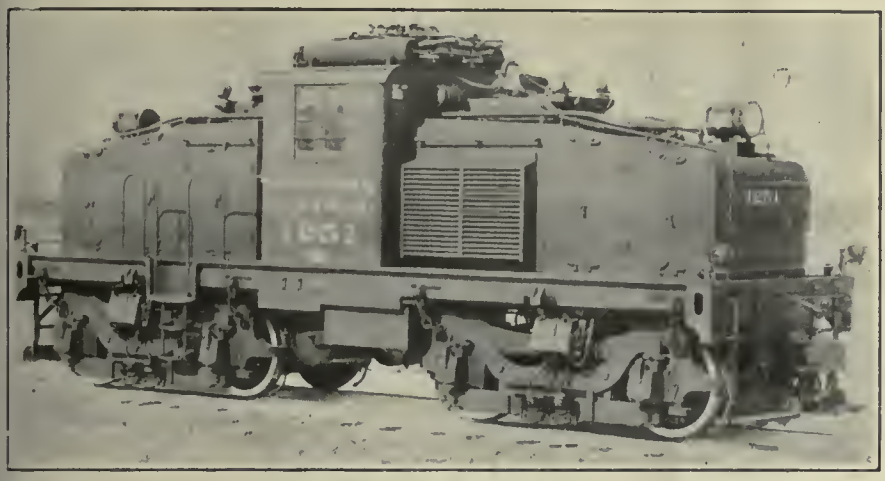
Delivery was recently made to the New York Central Railroad of seven 600-volt 100-ton switch engines for use in switching service on the electrified portions of the line between Harmon and New York. These locomotives were built by the American Locomotive Company and the electrical apparatus supplied by the General Electric Company.

The electric equipment consists of four GE-286-A motors, with 72-17 gearing. P.C.L. three-speed control is provided, with eleven, seven and eight steps, and two reduced field running steps on each full field connection. The platforms on the locomotives are made

J. G. Brill Enters Picturesque Float in Philadelphia Pageant



AN INTERESTING feature of the industrial pageant held in Philadelphia, Pa., on June 3 in honor of the Sesqui-Centennial celebration was a float of the J. G. Brill Company. Uncle Sam manually controlled the car moving around the world, and he was at the same time in a motorman's position on the "car" behind the world, thus expressing the thought that he led the representatives of the different countries. These representatives, riding on the body of the float, were seated on Brill seats.



Exterior View of 100-Ton Switching Electric Locomotive for New York Central

ACCEPTANCE TESTS OF CLASS Q ELECTRIC LOCOMOTIVES

Equipped with 4 G. E. 286-A Motors

	Run No. 1	Run No. 2	Run No. 3	Run No. 4
Date	April 18, 1926	April 18, 1926	April 18, 1926	April 18, 1926
Extent of run	Harmon to Marble Hill	Marble Hill to Harmon	Harmon to Marble Hill	Marble Hill to Harmon
Locomotive No.	1250	1250	1250	1250
Number of cars	54 { 37 empty 14 loaded 3 cabooses	54 { 37 empty 14 loaded 3 cabooses	53 { 37 empty 13 loaded 3 cabooses	53 { 37 empty 13 loaded 3 cabooses
Weight of cars, tons	1,474	1,474	1,438	1,438
Weight of locomotive	100	100	100	100
Weight of train	1,574	1,574	1,538	1,538
Number of stops	5	5	5	5
Total length of stops	12'-9"	11'-28"	12'-1"	14'-41"
Elapsed time	1-22'-25"	1-14'-37"	1-14'-25"	1-17'-18"
Maximum speeds, m.p.h.	28-32.4	28.3-30.7	29.5-33.5	26.2-30.9
Voltage for above speeds	605-640	580-645	550-690	500-680
Watt-hours per trailing ton-mile	29.5	26.7	25	25.4
Exploring Coil Temperatures				
Motor armature	1 C.	2 C.	3 C.	4 C.
Temperature at end of run				
Motor No. 1	94 C.	97 C.	96 C.	95 C.
Motor No. 2	92.5 C.	88 C.	94 C.	90 C.
Air temperature	9 C.	8 C.	10 C.	10 C.

by the Commonwealth Steel Company. The motors have a continuous rating of 430 amp. and the hourly rating is 460 amp. Fifteen-hundred-volt insulation is provided on the contactors and motors.

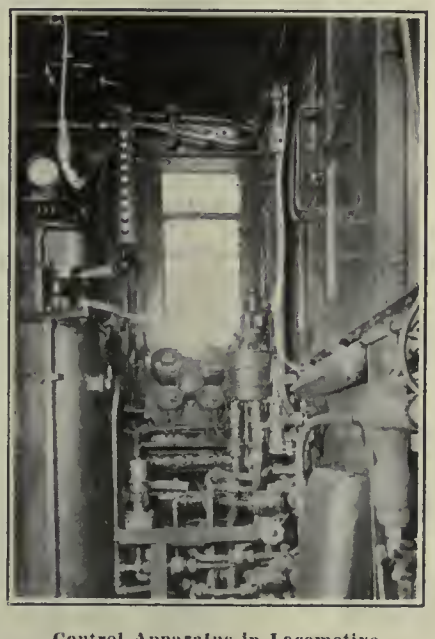
The locomotives are capable of hauling a 1,500-ton train at 25 m.p.h., at an average voltage of 575. It is expected that the locomotives can do better than 25 m.p.h. over the profile of the New York Central electrified division. The new locomotives are provided with both overhead and third-rail collectors.

For the purpose of checking the heating of the motors, four acceptance test runs were made on April 18, 1926, between Harmon and Marble Hill. The weight of the test train was approximately 1,500 tons and was made up of 37 empty and seventeen loaded cars. Five two-minute intermediate stops were made with a layover at each end of each run of seventeen minutes. The length of each run was 23.5 miles. Indicating and recording instruments were installed on a caboose attached to the locomotive to obtain speed, voltage, current temperature of motors and kilowatt-hours, etc. The results of these runs showed the locomotive well within the specified requirements.

The more important characteristics of these switching electric locomotives will be found in an accompanying table.

In addition to the switching locomotives, which have just been delivered, ten passenger electric locomotives are in process of construction as well as two 170-ton road freight electric locomotives. The passenger locomotives will be of a type similar to those in operation on the New York Central Lines.

Type.....Double truck, four 44-in. wheels
Length over coupler faces.....38 ft.
Truck center .....20 ft.
Total wheelbase .....28 ft. 3 in.
Total weight .....100 tons
Weight on drivers .....100 tons
Horsepower per locomotive 1,330
Motors..Four GE-286-A 660-volt multipolar geared
Gear ratio .....4.235; gear, 72; pinion, 17
Capacity.....1,500 tons on 575 volts
Speed:
Design 25 m.p.h. with 1,500 tons trailing load.
Test 35 m.p.h. with 1,500 tons trailing load..
Safe operating speed (light).....40 m.p.h.
Acceleration.....0.18 m.p.h.p.s.
Tractive effort with 20 per cent adhesion 40,000 lb. per locomotive.
Watt-hours per ton-mile—25 to 29.5 on four test runs.



Control Apparatus in Locomotive

Yellow Sales Total 30 Buses to Electric Railways During May

The following sales of bus equipment to electric railway properties are reported for the month of May by the Yellow Truck & Coach Manufacturing Company, Chicago, Ill.:

Connecticut Company, New Haven, Conn., five Z-29-passenger city service coaches.

Dominion Power & Transmission Company, Hamilton, Ont., Canada, nine X 21 city service chassis.

Michigan Electric Railways, Jackson, Mich., two X-21-passenger city service coaches.

Wisconsin Public Service Company., Milwaukee, Wis., one X-21-passenger city service coach.

Chicago, Aurora & Elgin Railroad, Aurora, Ill., one "Y" parlor coach.

Springfield Street Railway, Springfield, Mass., two Z-29-passenger city service coaches.

San Antonio Public Service Company, San Antonio, Tex., seven X-21-passenger city service coaches.

Colorado Springs & Interurban Railway, Colorado Springs, Col., three "X" parlor coaches.

Ohio Brass Issues Rail Poster

An instruction poster describing the difference between the steel metallic and copper metallic arc welding processes and illustrating the proper method of applying the Titon and AW-12 arc weld bonds has just been published by the Ohio Brass Company, Mansfield, Ohio. The poster is intended as a guide for welders responsible for the installation of rail bonds. Copies are available without cost and will be mailed upon request to the company.

General Tire Gets Cincinnati Contract

The largest contract for automobile tires ever placed in Cincinnati, Ohio, has been awarded by the Cincinnati Street Railway for its motor buses. The contract is for two years and the total amount in money exceeds $250,000. The contract was awarded to the General Tire Company, Akron, Ohio, through the firm of Sohngen & Bischoff, its Cincinnati representative. It was estimated that approximately 3,000 tires would be used. The size of the tires is 34 in. x 7 in. on the six-wheel buses and 36 in. x 6 in. on the four-wheel buses.

Westinghouse Officials Move to New York

Further steps in the reallocation of the Westinghouse Electric & Manufacturing Company's sales department, under the recently announced reorgan-

ization plan, have been taken with the transfer of three officials of this department from Pittsburgh to New York City. The officials are Myles B. Lambert, transportation sales manager; E. H. Froebel, central station sales manager, and Bernard Lester, industrial sales manager.

Rolling Stock

Arkansas Central Power Company, Little Rock, Ark., has received six of its order of 30 cars from the American Car Company, St. Louis, Mo. These are single-entrance safety cars with an over-all length of 28 ft. 6½ in. The other cars are in the paint shop and delivery will be made shortly.

Morris County Traction Company, Morristown, N. J., has received five street car type buses during the period from May 15 to May 31. These buses were purchased from the Fageol Company of Kent, Ohio.

San Francisco, Cal.—Bids for fifteen new Municipal railway cars will be called for by the Board of Works within a short time. This action follows the appropriation of $255,000 for this purpose by the finance committee of the Board of Supervisors.

Butte Electric Railway, Butte, Mont., has received one six-cylinder street car type bus from the Fageol Motors Company of California.

Los Angeles Motor Bus Company, Los Angeles, Cal., a subsidiary of the Los Angeles Railway and the Pacific Electric Railway Companies, received delivery in May of two double-deck Fageol buses from the Fageol Motors Company, Oakland, Cal. They were equipped with Westinghouse air brakes.

Track and Line

Connecticut Company, New Haven, Conn., is planning to start work soon on laying double track for its line on Forbes Avenue, New Haven.

San Francisco, Cal.—Contract for the 4,232-ft. Duboce rapid transit tunnel, to open the Sunset District for more rapid residential development, has been signed. The estimated cost is $1,650,000. It is proposed to have cars of the Market Street Railway operating through the tunnel within fifteen months, reducing the time of travel from the Pacific Ocean beach terminal to the San Francisco ferry building from five to 39 minutes over this route. Traffic intensity will determine the degree of reduction.

Evanston Railway, Evanston, Ill., will soon undertake the extension of its Central Street line from Lincolnwood Drive to Ridge Road, a distance of approximately ¾ mile. The thoroughfare is unimproved, but the company will pave the width of its single track with asphalt. All materials for construction are on hand.

United Railways & Electric Company, Baltimore, Md., and the city of Baltimore will share the expense of relocating car tracks on streets that are to be widened in acordance with an agreement ratified by the City Council. It is planned to shift the car tracks to the center of a number of the streets that are to be widened. The agreement was drawn some time ago and was approved by the Board of Estimate. Then it was submitted to the City Council for ratification.

Piedmont & Northern Railway, Charlotte, N. C., will spend $75,000 on a track expansion project on South Mint Street. The laying of 4 miles of additional track and the construction of an automobile unloading platform will make up the improvement program.

Cincinnati, Ohio.—An ordinance to amend the electric railway franchise and to accelerate the track construction program of the Cincinnati Street Railway has been introduced in the City Council. The measure allows the railway $400,000 additional in 1926 and reduces the sum it may spend in later years on track repair work. The franchise requires the railway to spend $1,750,000 in track rebuilding over a four-year period.

Milwaukee Electric Railway & Light Company, Milwaukee, Wis., has announced a city-wide track reconstruction program which will cost more than $1,000,000. Reconstruction of the track zone on East Water Street, costing approximately $55,000, is practically completed. New rails and paving of the track zone costing $15,000 will take place on Layton Boulevard. This work is being done in connection with the city's plan to eliminate the raised parkway in the center of the boulevard. When this is completed work will be switched to the extension of the Center Street double-track line, costing $45,000. Other major track improvements outlined in the program for completion this summer approximate $300,000. Suburban lines also will come in for their share of improvements. To provide transportation for the rapidly growing district of Whitefish Bay, served by the Oakland-Delaware line, new tracks will be laid on Washington Avenue. This work will cost $13,000.

ELECTRIC RAILWAY MATERIAL PRICES—June 15, 1926

Metals—New York

Copper, electrolytic, cents per lb.	14.025
Lead, cents per lb.	8.20
Nickel, cents per lb.	35 00
Zinc, cents per lb.	7 57
Tin, Straits, cents per lb.	61 125
Aluminum, 98 to 99 per cent, cents per lb.	27.00
Babbitt metal, warehouse, cents per lb.:	
Commercial grade	54 00
General service	30.50

Bituminous Coal

Smokeless mine run, f.o.b. vessel, Hampton Roads	$4.325
Somerset mine run, Boston	1 875
Pittsburgh mine run, Pittsburgh	1 75
Franklin, Ill., screenings, Chicago	1.80
Central, Ill., screenings, Chicago	1 75
Kansas screenings, Kansas City	2.425

Track Materials—Pittsburgh

Standard steel rails, gross ton	$43.00
Railroad spikes, drive, Pittsburgh base, cents per lb.	2 90
Tie plates (flat type), cents per lb.	2.35
Angle bars, cents per lb.	2.75
Rail bolts and nuts, Pittsburgh base, cents, lb.	4.25
Steel bars, cents per lb.	2.00
Ties, white oak, Chicago, 6 in.x8 in.x8 ft.	$1.35

Hardware—Pittsburgh

Wire nails, base per keg	2.65
Sheet iron (28 gage), cents per lb.	3.10
Sheet iron, galvanized (28 gage), cents per lb.	4.30
Galvanized barbed wire, cents per lb.	3.35
Galvanized wire, ordinary, cents per lb.	2.50

Waste—New York

Waste, wool, cents per lb.	12–18
Waste, cotton (100 lb. bale), cents per lb.:	
White	13–17.50
Colored	10–14

Paints, Putty and Glass—New York

Linseed oil (5 bbl. lots), cents per lb.	11.85
White lead in oil (100 lb. keg), cents per lb.	15.00
Turpentine (bbl. lots), per gal.	$0.89
Car window glass, (single strength), first three brackets, A quality, discount*	84.0%
Car window glass, (single strength), first three brackets, B quality, discount*	86.0%
Car window glass, (double strength) all sizes, A quality, discount*	85.0%
Putty, 100 lb. tins, cents per lb.	4–6

* Prices f.o.b. works, boxing charges extra.

Wire—New York

Copper wire, cents per lb.	16.00
Rubber-covered wire, No. 14, per 1,000 ft.	$6.25
Weatherproof wire base, cents per lb.	18.00

Paving Materials

Paving stone, granite, 5 in. New York—Grade 1, per thousand	$147
Wood block paving 3½, 16 lb. treatment, N. Y., per sq.yd.	$2.70
Paving brick 3½x8½x4, N. Y., per 1,000 in carload lots	51.00
Paving brick 3x8½x4 N.Y., per 1,000 in carload lots	45 00
Crushed stone, ¾-in., carload lots, N. Y., per cu.yd.	1.85
Cement, Chicago consumers' net prices, without bags	2.10
Gravel, ¾-in., cu.yd., f.o.b. N. Y.	1.75
Sand, cu.yd., f.o.b. N. Y.	1.00

Old Metals—New York and Chicago

Heavy copper, cents per lb.	11.50
Light copper, cents per lb.	9 75
Heavy brass, cents per lb.	7 125
Zinc, old scrap, cents per lb.	4 25
Lead, cents per lb. (heavy)	7 25
Steel car axles, Chicago, net ton	$17 25
Cast iron car wheels, Chicago, gross ton	15 25
Rails (short), Chicago, gross ton	16 25
Rails, (relaying), Chicago, gross ton	25.50
Machine turnings, Chicago, gross ton	6.75

Trade Notes

Gibb Welding Machines Company, Bay City, Mich., manufacturer of electric arc, spot and seam welders, broke ground June 10 for an addition to its factory that will more than double its present floor space.

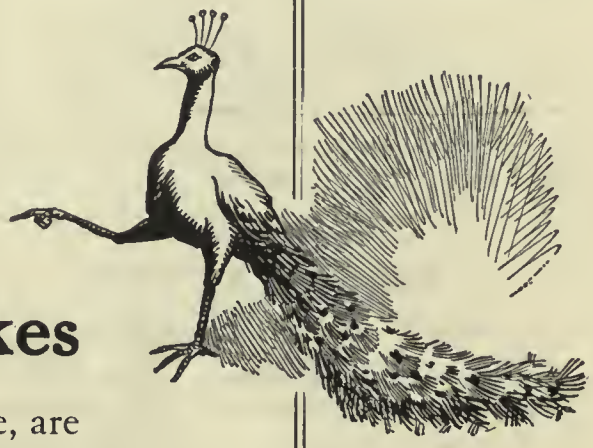
Maurice N. Trainer, has resigned as representative of the eastern district of the sales department of the American Brake Shoe & Foundry Company, headquarters New York office, and has been elected vice-president of the American Malleables Company with headquarters at Lancaster, N. Y. The American Malleables Company is a subsidiary of the American Brake Shoe & Foundry Company.

New Advertising Literature

The Spicer Manufacturing Corporation, South Plainfield, N. J., has issued a price list on Spicer parts for the type M cushioned coupling.

Okonite Company, Passaic, N. J., has issued a series of leaflets stressing the advantages to be obtained from the use of Okocord, Manson tape, Dundee A friction tape, Dundee B friction tape, Okonite tape and Okonite cement. Copies of these leaflets, which are prepared in a very interesting fashion, are available to all who may desire them and will be mailed upon request by the Okonite Company.

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Equip those modern light-weight cars with

Peacock Staffless Brakes

Because they require minimum platform space, are light in weight yet have tremendous braking power, Peacock Staffless Brakes are well adapted to the modern light-weight safety car.

Because they are dependable under all conditions—even with the heaviest passenger load on the steepest grade—these brakes are a guarantee of safety in any emergency.

Peacock Staffless Brakes provide three times the power of ordinary ones and have a chain winding capacity of 144 inches which sets the brakes no matter what the brake rigging conditions may be.

Installation costs are small and maintenance costs are practically negligible.

Write for further particulars and for estimates on your installation.



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For Locomotives, Passenger, Freight and Electric Cars
Smooth Forged or Rough Turned—Carbon or Alloy Steel—Plain or Heat Treated, Forged and Turned Piston Rods, Crank Pins, Large Shafts, Round Bars, etc.


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A. STUCKI CO.
Oliver Bldg.
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ACME Window Curtain Fixtures
Noiseless — direct acting — enlarged friction surface — less parts — stronger — more easily and finely adjusted.
MORTON MANUFACTURING COMPANY
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UNA
RAIL BONDS-RAIL JOINTS
DYNAMOTORS
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HASKELITE *and* PLYMETL

can readily be repaired— but they seldom need it

"WE have proved that it is hardly ever necessary to replace a PLYMETL panel due to the fact that this material will stand so much more abuse than the ordinary light metal covering."

This is from the letter of a large builder of street cars and buses. The same letter describes in detail the repair of a PLYMETL side panel on which the exterior steel sheet had been badly crimped, concluding with this: "They turned out a first class job at a very small cost for material. It is my opinion that if the body had not contained PLYMETL girder sheets, it would have been necessary to replace at least two panels entailing a very high expense."

HASKELITE roofs resist terrific impacts and when they *are* punctured, it is a simple matter to saw out the damaged section to a rectangular shape, beveled at the edges, fit in a new piece of HASKELITE, glue the edges, and replace the cover.

Yes, HASKELITE and PLYMETL make repair work comparatively easy. But best of all, they make it practically unnecessary.

Haskelite
Manufacturing Corporation
133 W. Washington Street
Chicago, Illinois

ERJ6-10Gray

The Major Factor In Your Total Investment

It has been estimated that 80% of the investment in Public Utility companies is in fixed assets—land, structures and equipment.

Even discounting the matter of public regulation and finance, in no other industry is there such a vital necessity for continuous accurate measurement of the value of fixed assets as in the Public Utility.

In no other industry is there such a vital necessity for the accurate property record, the useful tool for adequate property maintenance and control that American Appraisal Service furnishes.

We offer you a large permanent appraisal organization and the experience and statistical data accumulated in the making of over 35,000 appraisals, among them some of the largest public utility properties in the United States and Canada.

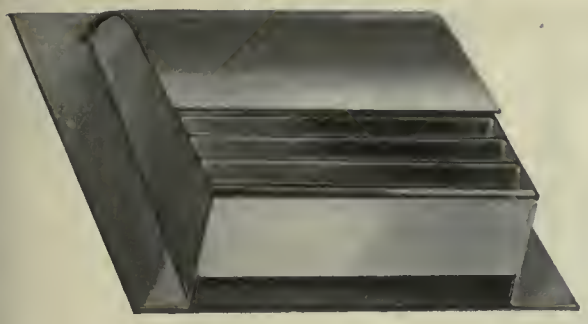
Our booklet No. 884-K, "The Property Owner's Handbook," tells how American Appraisals meet the everyday general requirements of property control. Our booklet No. 870-K, "Public Utility Valuations," discusses the specific applications of American Appraisal Service to the requirements of Public Utility Management. We will send these to you on request.

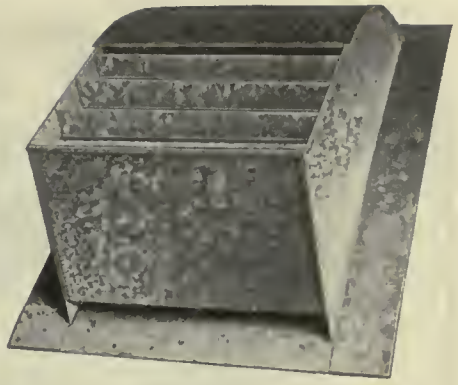
The American Appraisal Co.

MILWAUKEE

PUBLIC UTILITIES - INDUSTRIALS - REAL ESTATE PROPERTIES - NATURAL RESOURCES

A NATIONAL ORGANIZATION





N-L Ventilators for the Modern Car

Appearance is a most important factor in choosing a ventilator for the modern car. Attempts to modernize the lines of a car are of no avail if the roof line is to be marred by clumsy, ill-appearing ventilators. N-L car ventilators, while designed to give a maximum exhaust, do not sacrifice good appearance.

The interior finish of the modern car demands that the ventilators be weather proof. N-L guarantees that their ventilators are thoroughly weatherproof, yet the ingenious water baffle does not choke up the air passage. Their ability to ventilate thoroughly is never questioned.

N-L

The Mark of a Better Ventilator

THE NICHOLS-LINTERN CO.

7960 LORAIN AVENUE CLEVELAND, OHIO

Represented in Canada by
Railway & Power Engr. Corp., Toronto, Ont.
In Australia, South Africa and Orient by
Nolan Smith & Co., Ltd., New York City

FISK

TRANSPORTATION
"Fillerless"
CORD TIRES



A Remarkable Statement from The Eastern Massachusetts Street Railway Company

In a recent letter to The Fisk Tire Company, the Eastern Massachusetts Street Railway Company made this statement:

> *"We have sixteen six-cylinder Fageol coaches equipped with Fisk tires. Six of these coaches have been operating since last December and the balance have been equipped from time to time since then. The coaches average about 4,000 miles a month.*
>
> *"Out of 111 casings we have not had one which was defective and are well satisfied with the service rendered us by your Company."*

The new Fisk Transportation Tire made of "Fillerless" Cord fabric, under Fisk's own patented process offers Bus operators a sure means of decreasing their tire costs.

Fisk Transportation "Fillerless" Cords are made in all bus and truck sizes.

The Fisk Tire Company, Inc.

Chicopee Falls, Mass.



Prompt Service–Everywhere

3865 Authorized Service Stations!



Continuity of operation is essential in passenger transportation. A motor coach awaiting repair parts from a distant factory not only disrupts carefully planned schedules, but becomes a costly burden.

Graham Brothers Motor Coaches are sold and serviced by Dodge Brothers Dealers everywhere. The advantage of immediate service by an organization of the character and reputation of Dodge Brothers Dealers is a factor that deserves the serious consideration of all Motor Coach Operators.

Graham Brothers Trucks, with Dodge Brothers ¾-Ton Commercial Cars, meet 90% of all haulage requirements.

GRAHAM BROTHERS
Evansville – DETROIT – Stockton
A DIVISION OF DODGE BROTHERS, INC
GRAHAM BROTHERS (CANADA) LIMITED–TORONTO, ONTARIO

GRAHAM BROTHERS MOTOR COACHES

SOLD BY DODGE BROTHERS DEALERS EVERYWHERE



In California

Fleet of 124 busses rides on Generals—*exclusively!*

Officials of the California Transit Company cannot afford to guess about tire life and tire costs!

For this company operates a fleet of 124 busses in and out of Oakland to various California points—and many of these busses operate on a schedule which calls for 500 miles of trouble-free service *every day!*

Ordinary tires soon wilt in such service, and operating costs climb sky-high. That's why the entire California Transit Company fleet is 100% General equipped.

The General Tire is built for bus service. Only the purest friction rubber is used—and in generous quantities! This means greater freedom from internal friction, longer tire life and lower tire costs, and a substantial saving in power and gasoline consumption.

And *that* means the lowest possible cost of operation.

The Mark of Leading Tire Stores Everywhere

The

GENERAL

TIRE

—goes a long way to make friends

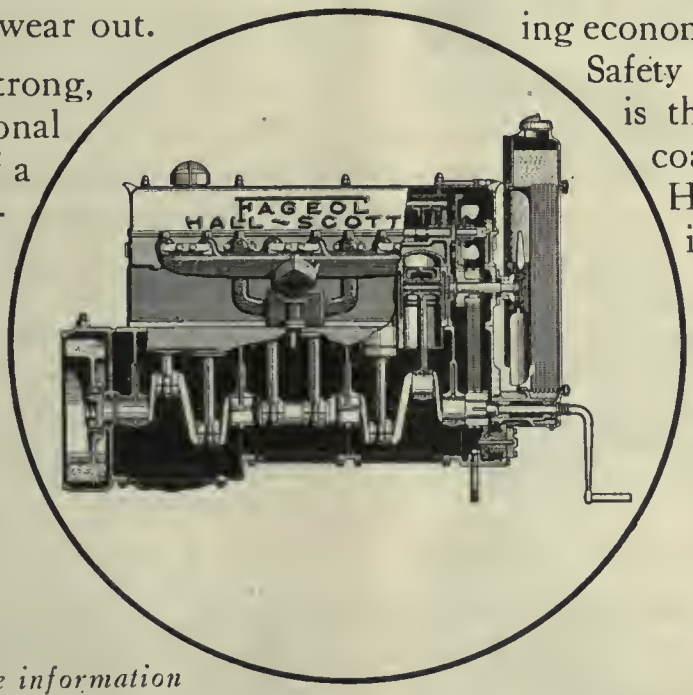
BUILT IN AKRON, OHIO, BY THE GENERAL TIRE AND RUBBER CO.



Nobody knows how long a Hall-Scott engine will last!

Operators who have used them for 300,000 miles or more say that there is no reason to believe that they will ever wear out.

It is brutally strong, and the occasional replacement of a few simple inexpensive parts brings this engine back to new condition. This is one of the chief reasons for the recognized operating economy of the Fageol Safety Coach, which is the only motor coach in which the Hall-Scott engine is available.



Ask for complete descriptive information

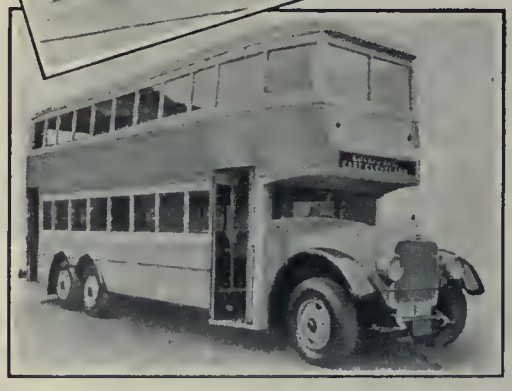
THE FAGEOL COMPANY
A Division of
AMERICAN CAR and FOUNDRY MOTORS COMPANY
30 CHURCH STREET, NEW YORK, N. Y.

Leece-Neville Voltage Regulation Is Used On These Busses















Wherever fine busses are found—wherever operators pay close attention to the care of batteries and comfort of passengers, there you will find Leece-Neville voltage regulation.

Makers of good busses either install it as regular equipment, or provide a mounting to receive it, because they know the favor it holds with operators.

It prolongs life of battery by preventing overcharge, goes as far as possible in insuring that batteries are always fully charged, keeps lights steady and unwinking. Lessened battery costs alone will pay for it in a short time.

There is a Leece-Neville Service Station near you. Write for its name. There you can see a demonstration of Leece-Neville voltage regulation and starting and lighting equipment.

The Leece-Neville Co.

CLEVELAND, OHIO

TIMKEN



In Philadelphia—

All motor coaches operated by the Philadelphia Rural Transit Company are Timken equipped—front and rear.

The fleet in city service—to consist of 320 gas-electric Yellow Coaches—will approximate 16,000,000 miles a year, with an average of eight stops per mile and an average speed of twelve miles per hour.

In addition, the fleet of 40 gas-electric Yellow Coaches in interurban service between Philadelphia, New York, Baltimore and Atlantic City, approximates 2,500,000 miles annually.

THE TIMKEN-DETROIT AXLE CO., DETROIT, MICH.

AXLES

SUPERIOR LACQUERS FOR FIFTY YEARS



Here's the "figurin" showing just why

EGYPTIAN LACQUERS

Cost less per car per year than paint for a more profitably attractive finish

Egyptian Lacquer Advantages

1. Egyptian Lacquer dries to a rich lustrous surface, infinitely better in appearance than paint. It will not crack, peel or blister under any conditions likely to be met with in street car or bus operation. And it will neither fade under the glare of summer sunshine nor become dingy with the buffeting of winter storms.

2. The surface obtained with the Egyptian Lacquer System is smooth and dense. This means that it is highly resistant to dust and mud, retaining its original smart appearance with the simplest of cleaning, and over an unusually long period. Cars and buses finished with Egyptian Lacquers run longer and earn more before needing a refinish.

Egyptian Lacquer Economies

1. Where formerly it required anywhere from *seven to fourteen days* for a good paint job, it takes but a fraction of this time to do a first class job with Egyptian Lacquers. Less sanding, less material and less skilled labor, to say nothing of very much less "shopping" time, these economies have made the Egyptian Lacquer System the choice of a rapidly growing list of prominent electric railway operators.

2. The average electric railway paint shop needs little if any additional equipment to carry out the Egyptian Lacquer System. No special apparatus of any kind is needed, successive coats of primer and lacquer being very easily applied with a standard spray gun, at hourly intervals.

Consult us before putting your next finishing or refinishing job in hand. We will gladly demonstrate to your satisfaction. *Bulletins and quotations on request.*

THE EGYPTIAN LACQUER MFG. CO.
90 West Street, New York

Double-deckers for Akron

The Six-Wheel Company of Philadelphia announces another important contribution to the motor bus industry.



A one-man operated fully-enclosed double-deck motor coach on pneumatic tires. Full headroom both decks.

The first of this new type has been delivered to The Northern Ohio Power & Light Co., Akron, Ohio

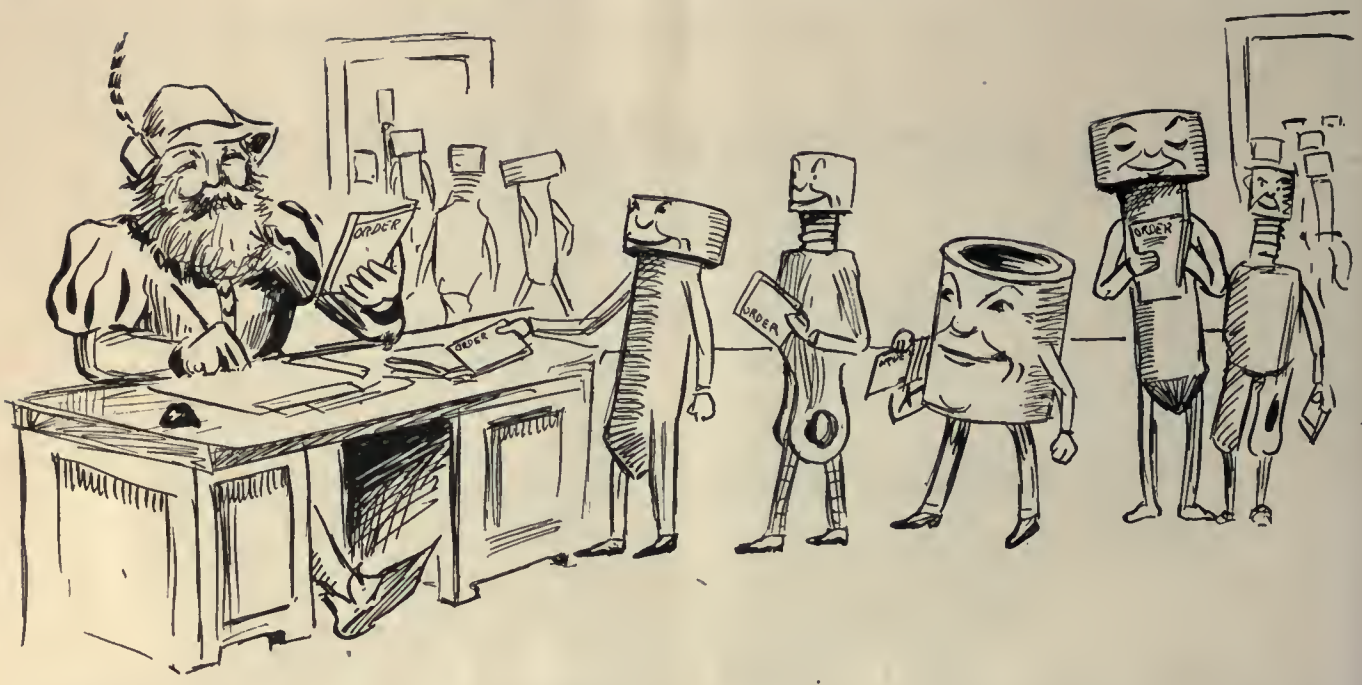
One-man operation possible at all times.
Two-man operation at peak hours if desired.
Rear door operated by pneumatic treadle.
Lower operating cost with safety.

Full particulars of this and other models on request.

THE SAFEWAY SIX-WHEELER

THE SIX WHEEL COMPANY, 1800 W. LEHIGH AVENUE, PHILADELPHIA, PA.

Manufacturers of De Luxe, City, and Double Deck Type Six-Wheel Coaches



Bringing in the repeats—

Some silver-tongued salesman may sell an initial order but only hard cold facts determine the placing of a repeat order.

Constant repeats, such as those received for Boyerized Parts are proof positive that these products are making good right on the job. The reason can be found in the fact that the special Boyerizing Process gives Boyerized Parts three or four times the life of ordinary steel car parts.

For a thorough test, try Boyerized Parts on your cars. Write for quotations on your requirements.



The McArthur Turnbuckle

Brake Pins
Brake Hangers
Brake Levers
Pedestal Gibs
Brake Fulcrums
Center Bearings
Side Bearings
Spring Post Bushings
Spring Posts
Bolster and Transom Chafing Plates
McArthur Turnbuckles
Manganese Brake Heads
Manganese Truck Parts
Bushings
Bronze Bearings

Bemis Car Truck Company

Electric Railway Supplies

Springfield, Mass.

Representatives:

Economy Electric Devices Co., Old Colony Bldg., Chicago, Ill.
F. F. Bodler, 903 Monadnock Bldg., San Francisco, Cal.
W. F. McKenney, 54 First Street, Portland, Ore.
J. H. Denton, 1328 Broadway, New York City, N. Y.
A. W. Arlin, 772 Pacific Electric Bldg., Los Angeles, Cal.



Proved!

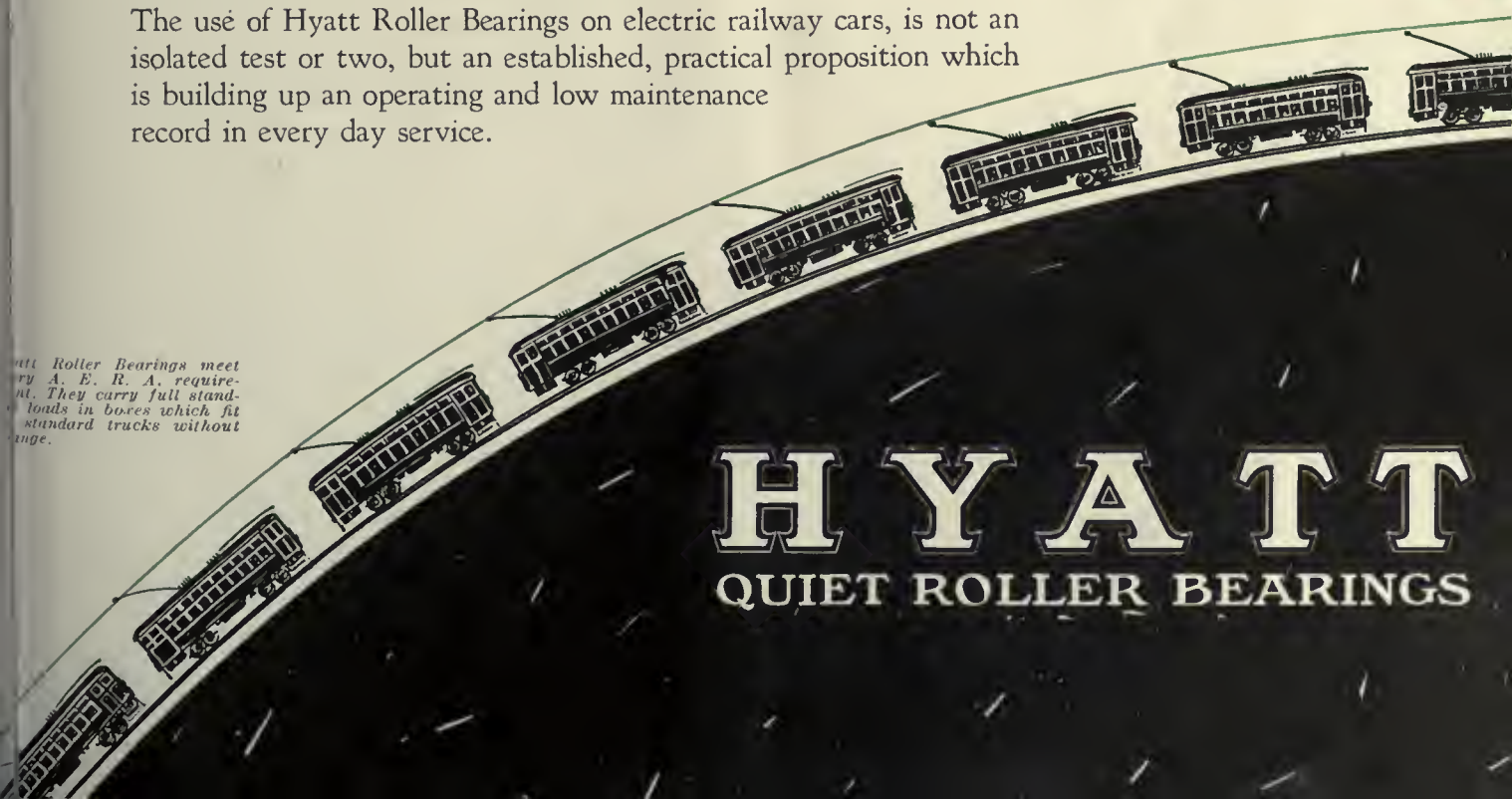
1,250,000

by more than ~~a million~~ car miles

The mileage accumulated by Hyatt-equipped cars is growing fast. New cars with Hyatt Roller Bearings are being put into service, while those already equipped carry on. That is why the figure above has changed so materially in four months.

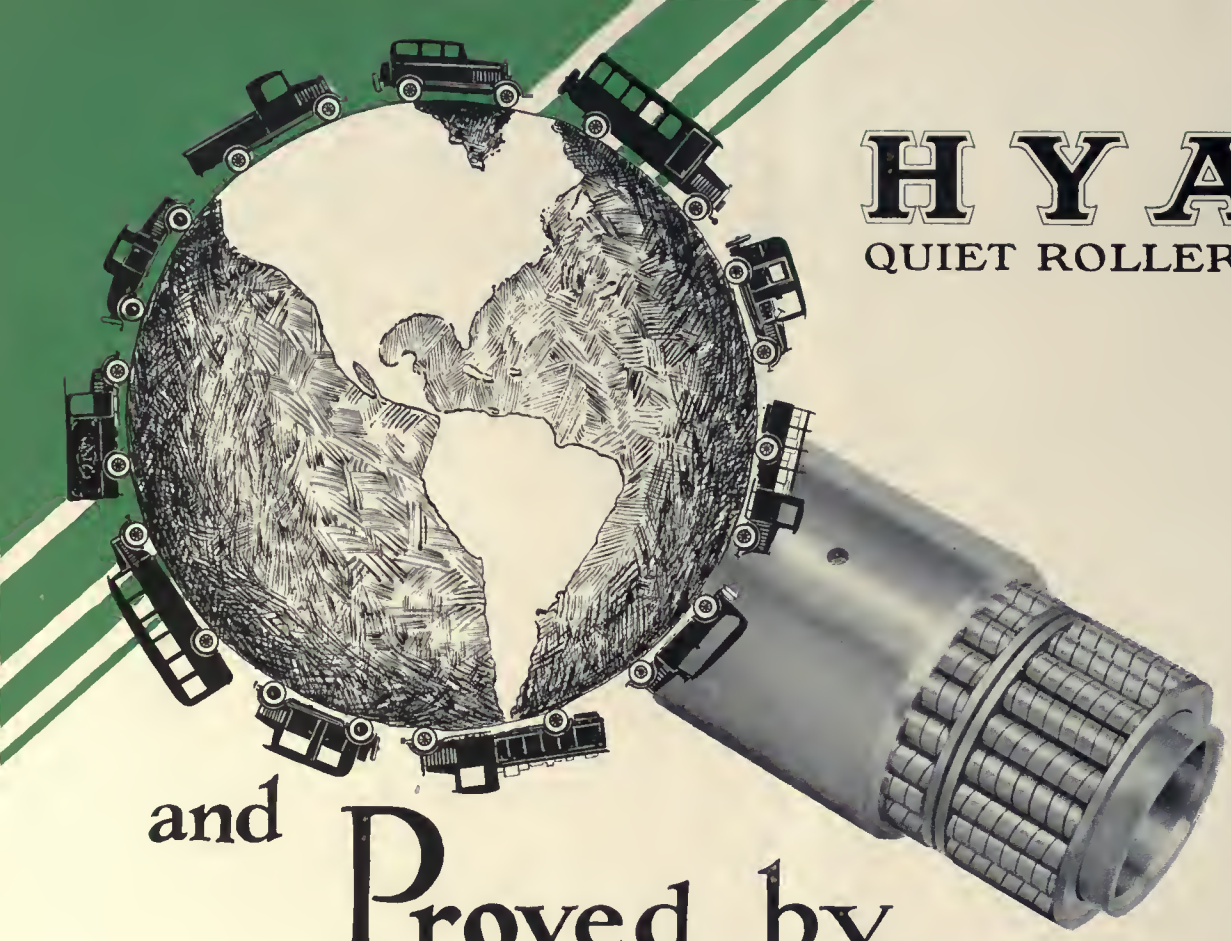
The use of Hyatt Roller Bearings on electric railway cars, is not an isolated test or two, but an established, practical proposition which is building up an operating and low maintenance record in every day service.

...tt Roller Bearings meet ...ry A. E. R. A. require-...nt. They carry full stand-... loads in boxes which fit ... standard trucks without ...nge.



HYATT

QUIET ROLLER BEARINGS



HYATT
QUIET ROLLER BEARINGS

and Proved by millions and millions of motor car miles

Since anti-friction bearings were first adopted in automobile design, many years ago, Hyatt equipment has been a recognized standard. The mileage of Hyatt equipment in trucks, busses and automobiles, if it could be estimated, would run into the hundreds of millions.

You know that a moderately strong push will serve to move your automobile on level ground. It has even been found possible for one man to move and "spot" a trolley car equipped with Hyatt Roller Bearings, on a certain Indiana road. Such easy motion means material savings in power. Let a Hyatt railway bearing engineer show you how your equipment can be modernized.

HYATT ROLLER BEARING CO., NEWARK, N. J.
(Division of General Motors Corporation)



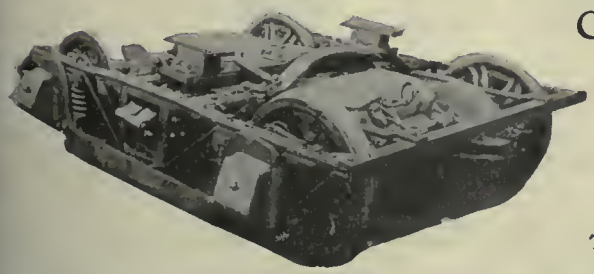
Modern Rolling Stock
Increases Earnings

ON many properties, both city and interurban lines, new cars of the modern type are attracting more patronage and operating at less expense than the older cars they replaced. New cars will do the same on your property. Let our engineers help you plan equipment to meet today's needs.

For instance, The Gary Railways of Gary, Indiana, and the Chicago and Joliet Electric Ry. Co., have recently placed orders with us for light weight one man interurban cars to replace heavy, two man operated cars.

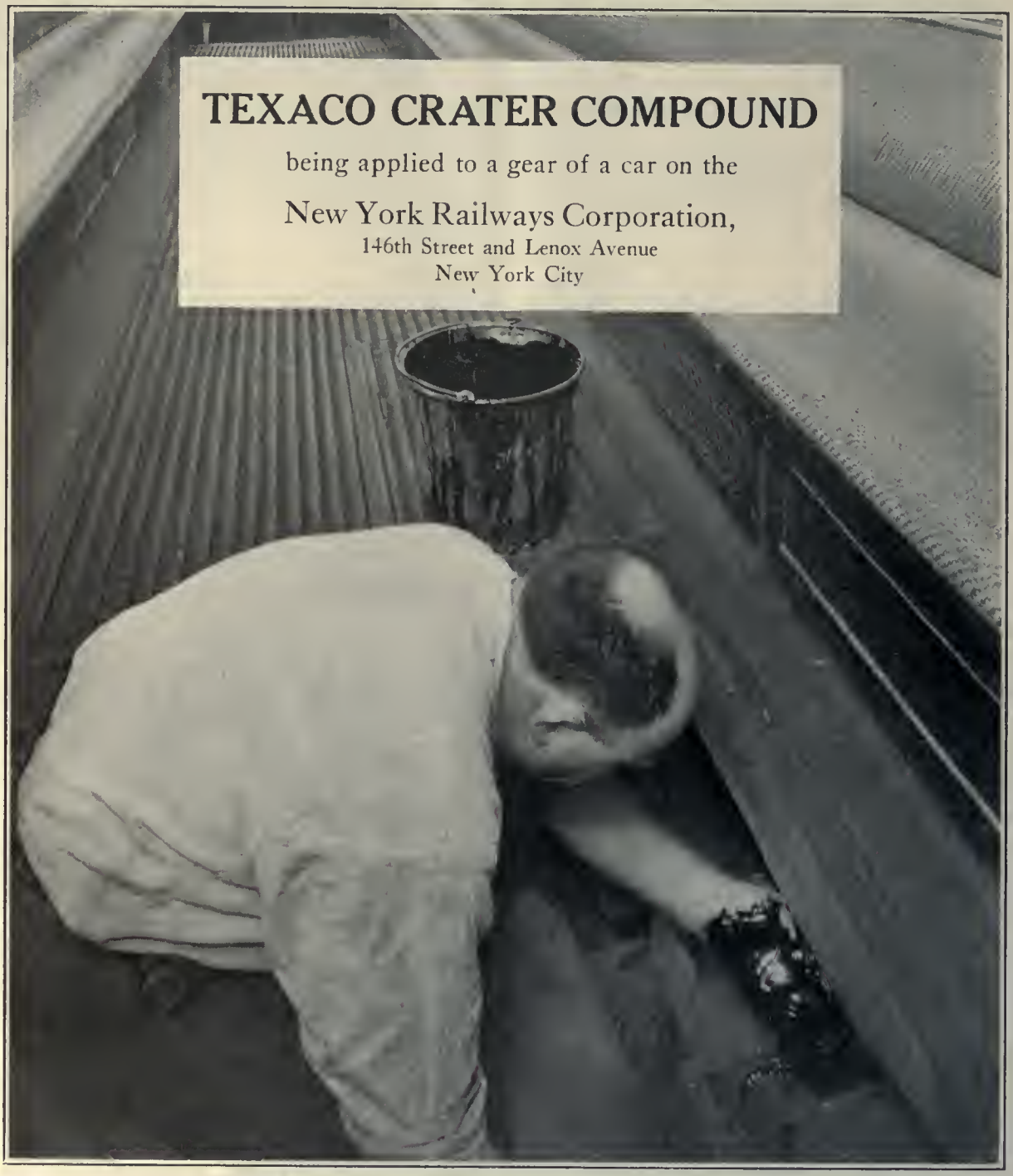
Cummings Car and Coach Company

Successors to McGuire Cummings Mfg. Co.
111 W. Monroe Street
CHICAGO



TYPE MC62 LOW CAR BODY TRUCK

LIGHT WEIGHT CITY AND INTERURBAN CARS. SINGLE AND DOUBLE TRUCKS. GAS-ELECTRIC MOTOR-COACH



TEXACO

The Chosen Lubricant of ELECTRIC RAILWAYS

The Texas Company, U. S. A., 17 Battery Place, New York City

OFFICES IN PRINCIPAL CITIES



Providence

THE United Electric Railways Company car, illustrated, serves New England's second largest city, and is equipped with "STANDARD" Rolled Steel Wheels

Rolled Steel Wheels
Quenched and Tempered Carbon Steel Axles
Coil and Elliptic Springs

STANDARD STEEL WORKS COMPANY

PHILADELPHIA, PA.

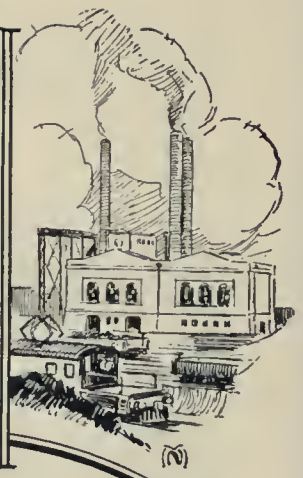
BRANCH OFFICES:

CHICAGO	PORTLAND, ORE.	ST. PAUL, MINN.
ST. LOUIS	RICHMOND, VA.	PITTSBURGH, PA.
NEW YORK	SAN FRANCISCO	LOS ANGELES, CAL.
HOUSTON, TEXAS	BOSTON	MEXICO CITY, MEX.

WORKS: BURNHAM, PA.



Lubrication and Power



THE cost of faulty lubrication shows itself not only in the repair and depreciation accounts, but also in the coal bill. Lubrication has two purposes. The first is to prevent the bearing surfaces from rubbing against each other and thereby causing undue wear. The second is to permit the machinery to run easily, so the least possible amount of power will be required to drive it.

When the bearings of any machine are lubricated with an oil that is too light to withstand the bearing pressure or the heat which that particular bearing develops, it permits the bearing surfaces to come together, and friction results. This not only causes rapid depreciation of the bearing, but it also necessitates more power to keep the machine running.

If too heavy an oil is used, it may not reach all parts of the bearing. But even if it does, the internal friction of the lubricant itself will impose a "drag" on the machinery, so that a certain excess of power will be required to operate it.

Of course, the additional power required to operate a single machine under these conditions is not very great, but when it is multiplied by the number of machines operating in the entire plant, the amount of extra power required is likely to mount up to surprising figures.

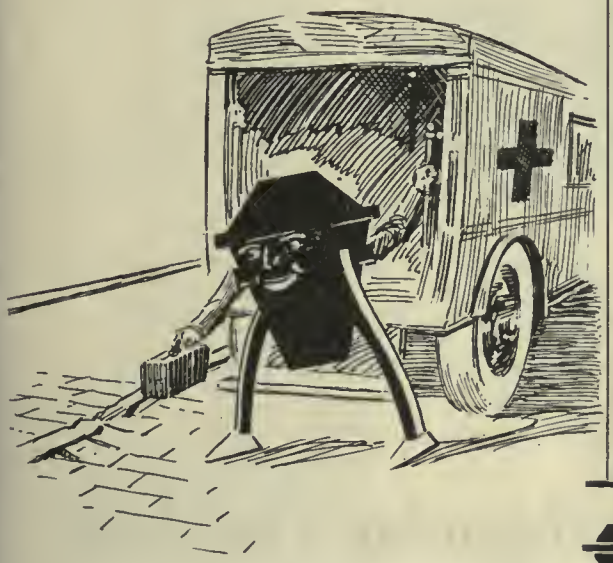
Correct lubrication will bring lower repair and maintenance bills, and will also show in the fuel bills.

Standard Oils and Greases

are made in many grades to meet the lubrication requirements of all machinery in use in the industrial world. Use the correct grades on all your machinery, and you will find a notable decrease in your fuel expense.

STANDARD OIL COMPANY
(INDIANA)
General Offices: **910 S. Michigan Ave., Chicago, Illinois**





"First-aid" and last! For old and defective rail Joints

LOOSE joints, cupped joints, broken joints—sore spots in the track system which cause abnormal noise, rough riding and actual damage to cars—these deserve prompt and effectual attention. Radio interference, due to defective bonds, is another new and disturbing feature of the rail joint problem. Why not cure these troubles now,—once and for all? Thermit Welding will do it, and thereby improve public relations.

Whereas the ordinary patch-work repair job on a joint is merely a temporary relief, Thermit Welding achieves a solid lasting job! It eliminates the joint completely and in its place affords a smooth-riding, continuous piece of rail as good as new.

THERMIT

THERMIT

METAL & THERMIT CORPORATION

120 BROADWAY, NEW YORK, N.Y.

PITTSBURGH CHICAGO BOSTON SOUTH SAN FRANCISCO TORONTO

Southern Equipment Men Favor "Tool Steel" Gears and Pinions

At the Electric Railway Association of Equipment Men—Southern Properties—meeting at Mobile, February 26th, 1926, the question was asked—"What difference have member companies found in the life of gears and pinions? Tool Steel, ———"

(The names eliminated are competitive gears).

Note in the framing of the question, "Tool Steel" was put first. It always is.

Nine Equipment Men gave their experience, most of them very flattering to "Tool Steel," none of them finding any other gear superior.

What the man who does not use them says—

"The good reports that we got in Mobile will bear fruit, and it certainly gives us something to think of when it comes to the replacement of gears and pinions."

This is the effect the discussion had upon one of the Members who had not been using "Tool Steel" gears.

The Tool Steel Gear & Pinion Company
Cincinnati, Ohio











Bethlehem

Track Specialties for Electric Railways

Special Trackwork; Tee and Girder Rails; Special Splice Bars for Welding; Machine Fitted Joints; Abbott and Center Rib Base Plates; Tie Rods; Bolts; Pole Line Material; Rolled Steel Wheels and Forged Axles.

Catalog Sent on Request

SPECIAL LAYOUTS AND TRACKWORK

BETHLEHEM STEEL COMPANY
General Offices; BETHLEHEM, PA.

District Offices:

New York, Boston, Philadelphia, Baltimore, Washington, Atlanta
Pittsburgh, Buffalo, Cleveland, Detroit, Cincinnati,
Chicago, St. Louis, San Francisco, Los Angeles, Seattle, Portland

Bethlehem Steel Export Corporation, 25 Broadway, New York City,
Sole Exporter of our Commercial Products

BETHLEHEM

EMPIRE New Process BOLTS

No more stripping. Use this bolt—and save time.



TIME is as important an economic factor in maintenance as in production. One of its chief allies is the Empire *New Process* bolt—the only bolt known that fits like a gauge and never strips its thread.

The cost of Empire *New Process* bolts is no greater than for the ordinary kind. The savings they effect are your profits. Samples for testing, if you want them.



The carton, too, is a time saver. Its prominent label shows size and style at a glance.

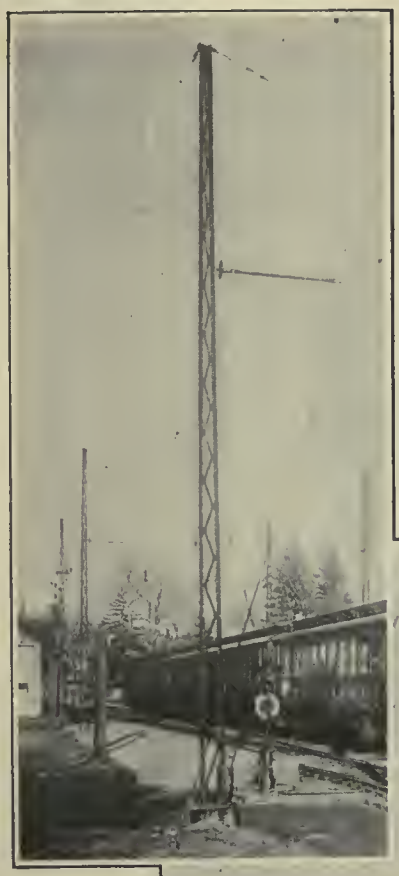


RUSSELL, BURDSALL & WARD BOLT & NUT COMPANY

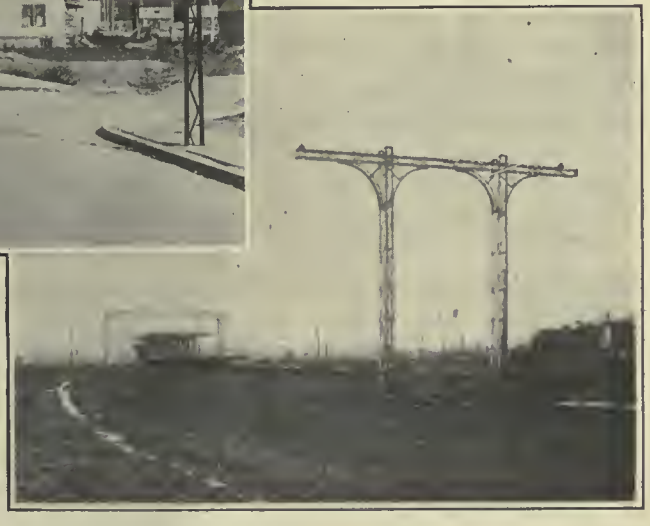
PORT CHESTER, N.Y.

Branch Office: Straus Building	Branch Office: General Motors Bldg.	Branch Factory:	Strimple & Gillette 169 Jackson Street	Maydwell & Hartzell, Inc. 158-168 Eleventh Street
CHICAGO	**DETROIT**	**ROCKFALLS, Ills.**	**SEATTLE**	**SAN FRANCISCO**

Makers of Bolts, Nuts and Rivets Since 1845







Every Form of Supporting Structure from one source—BATES

KEEPING step with the developments of the electric railway industry, and its need for a wide variety of supporting structures, Bates Products have developed from the original Bates Pole to meet every need. In our own plants, we are manufacturing Bates one-piece expanded steel poles, fabricating towers and other more elaborate structures, and when required, galvanizing these products. Bates Fabricated Structures often combine Bates Expanded Steel sections, thus reducing the number of riveted joints and making for greater lightness and strength.

Whatever your requirements, you will find it advantageous to secure an estimate from Bates.

AN ORGANIZATION *specializing on the supporting structure requirements of the electrical industries, having complete facilities for designing, detailing, fabricating and painting or galvanizing its products, all within one company.*

Specify Bates
POLES
TOWERS
SUBSTATIONS

Bates Expanded Steel Truss Co.

General Offices and Plants
EAST CHICAGO, INDIANA, U. S. A.



An "old saw" that still cuts

Much fun has been poked at the old saw that "my line of business is peculiar." But she still seems to cut.

Of course your line of business is peculiar. It must be. It is obvious that there is no line that has not problems all its own—and plenty of them.

Recognizing a problem as a problem is the first step in solving it. Getting all the facts and getting them clearly in mind is the next. In both of these your A. B. P. papers can be of great value if you will but make use of them.

They will do more than report situations and last-minute developments. They will do more than supply accurate facts. They will, through their editors, present the viewpoint of men seasoned by long experience in your line of business, men able to offer constructive suggestions and constructive criticisms.

The advertising pages of an A. B. P. member paper are well worth close and constant study. They, too, are full of suggestions for economy. And publishers of member papers of the A. B. P. are living up to their pledge "to decline any advertisement which has a tendency to mislead or which does not conform to business integrity."

THE ASSOCIATED BUSINESS PAPERS, Inc.
Executive Offices: 220 West 42nd St., New York, N.Y.

A.B.P.

An association of none but qualified publications reaching 56 fields of trade and industry.

The Electric Railway Journal is a member of The A. B. P.

HITENSO
for strength

Where service conditions are exceptionally severe—

Where traffic interruptions are unusually costly—

Where overhead wires run under elevated structures or along subway ceilings—

Hitenso Trolley Wire—exclusively an Anaconda product—serves best.

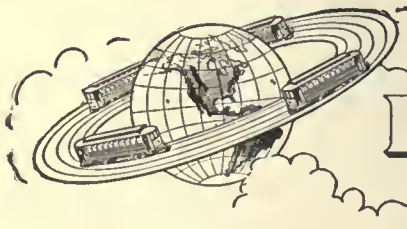
Hitenso "C" combines great strength with the least possible sacrifice in conductivity. It meets the physical requirements of the A.S.T.M. specifications for high strength bronze and exceeds in conductivity by 15%.

It has proved its dependability and economy in many outstanding installations.

ANACONDA COPPER MINING CO.
THE AMERICAN BRASS COMPANY
Rod, Wire and Cable Products
General Offices: 25 Broadway, New York
Chicago Office: 111 W. Washington St.

ANACONDA TROLLEY WIRE

The creation and maintenance of car advertising space values requires the same degree of highly specialized knowledge as the construction and maintenance of railroads. Such tasks should be delegated only to those of widest experience and longest record of success.



Barron G. Collier
INCORPORATED
CANDLER BLDG. NEW YORK

AM CRE CO Creosoted Southern Yellow Pine POLES



Are Treated With Pure Creosote Oil

ONE of the most vital factors in the life of a creosoted pole is the quality of the oil used in its treatment. When you buy such poles you naturally want to know that oil which is a proven preservative has been used.

Since such creosoted oil is only produced as a by-product of the distillation of coke oven coal gas tar, it is important in all cases to know the origin of the oil.

The organization maintained by this company in the leading producing centers of Europe and America is constantly studying the conditions in the producing field to insure the selection of the oil best suited to the requirements of wood preservation. From the time of purchase until it is injected into a pole the oil is never out of the control of this organization.

When you buy treated poles you are entitled to the best quality creosote oil. You can insure that quality by specifying AmCreCo.



AMERICAN CREOSOTING COMPANY
INCORPORATED

COLONIAL CREOSOTING COMPANY INCORPORATED

AM CRE CO LOWRY PROCESS CREOSOTED WOOD

GEORGIA CREOSOTING COMPANY INCORPORATED

LOUISVILLE ~ KENTUCKY

SALES OFFICES

330 MADISON AVE. NEW YORK CITY — 401 W. MAIN ST. LOUISVILLE, KY.
BOGALUSA, LA. BRUNSWICK, GA.

ERJ6-19Gray

Sell it to Mr. Smith

Which Mr. Smith? There are 92 of them listed, with initials and addresses, the railway company with which they are affiliated and their position. This is an indication of the wealth of accurate, up-to-date information in

McGRAW
Electric Railway Directory
(1926 Edition)

Mr. Smith may be shop foreman, Superintendent of Equipment, treasurer or president of the company. He is the man to whom your salesman wants to tell his story.

The directory, a complete census of the electric railway field contains all the important data that each member of a sales organization or anyone in contact with the field should have on hand at all times. It lists the company, the officials, how many cars and miles of track are operated and many other details about an organization and since last year it took 65% changes to bring it up to date.

Detach the coupon and get this latest edition now.

Contents:

1. Complete list of electric railway companies in the United States, Canada, Mexico and the West Indies.
2. List and address of officials, superintendents, department heads and purchasing agents, corrected to date of issue.
3. Companies operating buses.
4. Addresses of bus repair shops.
5. Mileage of track and bus routes.
6. Number and kinds of cars used.
7. Rates of fare.
8. Amusement parks owned or reached.
9. Numerous other features of a statistical nature.

Electric Railway Journal
Directory Department
Tenth Ave. & 36th St., New York, N. Y.

Gentlemen:

Please send me.....copies of 1926 McGraw Electric Railway Directory.

Check for $*..... is enclosed.

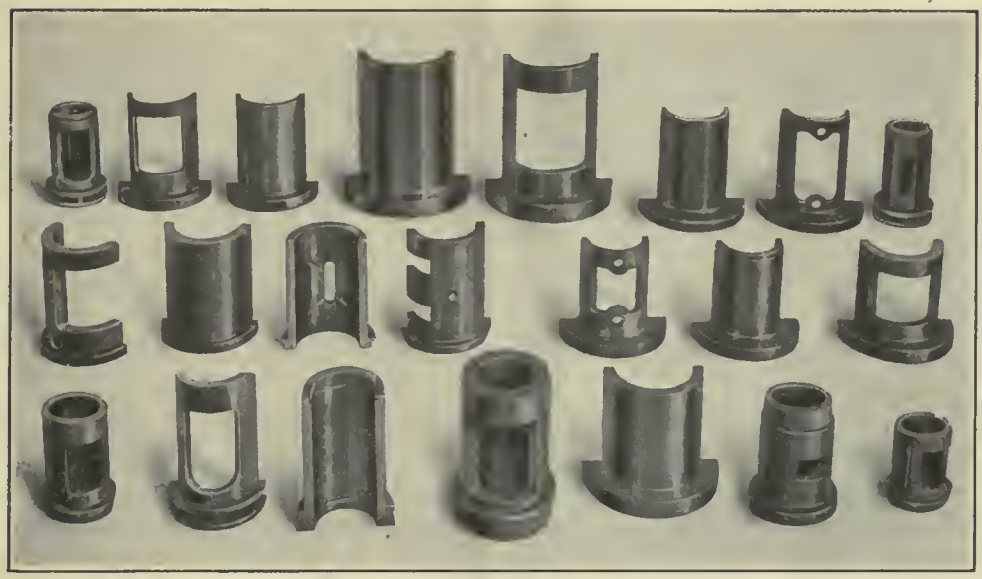
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Company .....

Street .....

City..... State.....

*Single copies $7.50. E.R.J. 6-19-26



Do Your Bearings "Stand the Gaff"?

Columbia No. 1— a bearing bronze developed by long experimentation — has been adopted by many roads as "standard" because of its long wearing qualities. They know it will "stand the gaff."

For years we have been specialists in the manufacture of bearings— armature and axle bearings, motor bearings, compressor bearings and journal bearings.

We know that in such bearings you will look for perfect halves, for interchangeability, for smooth and perfectly machined surfaces.

You will find the qualities you look for in all Columbia products.

We have patterns on hand for all the standard electric railway motors and many bearings with special dimensions for rebored motors or re-turned shafts on axles.

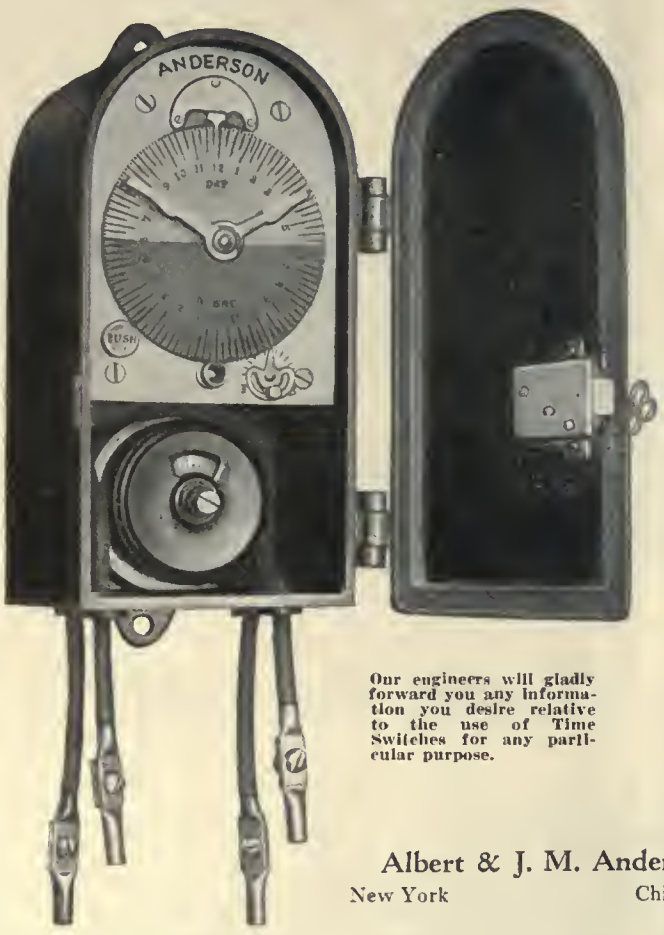
May we send you information and an estimate on bearings or any other of our standard products?

The

COLUMBIA MACHINE WORKS

and Malleable Iron Company

Chestnut St. and Atlantic Ave. Brooklyn, N. Y.



Our engineers will gladly forward you any information you desire relative to the use of Time Switches for any particular purpose.

Many uses for Time Switches

This handy Time Switch will automatically turn an electrical circuit on and off at the predetermined times at which it is set. You can use it for electric signs, illuminated billboards, street lighting, automatic substations, heating circuits, circuit breaker operation and many other applications where a circuit must be opened and closed or closed and opened at definite periods.

But be sure it is an Anderson you install if you want positive, unfailing operation.

Every part of this dependable Time Switch including the clock, which is the heart of a Time Switch, is built under the same roof.

Many Andersons have been in constant operation, except for an occasional cleaning, for over eighteen years and are still giving satisfactory service, because they were designed then as they are today for absolute dependability.

Send for Bulletin No. 37

Albert & J. M. Anderson Mfg. Co., 289-305 A St., Boston, Mass.

New York Chicago Philadelphia London

H-B Life Guards Save Lives!!

Scarcely a day goes by that some one does not owe his life to the efficiency of an H-B Life Guard because in this day and age with the crowded traffic conditions it is almost impossible to avoid accidents, so be prepared to do your part as far as humanly possible by equipping your cars with a life guard which may be depended upon—one which will not fail in an emergency, because it is *built right* based on years of experience in specializing on these equipments.

You Should Be Sure

That sound materials and expert workmanship go into the guards you use for so important a thing as to save life. MAKE SURE BY SPECIFYING

H-B LIFE GUARDS

Manufactured by

THE CONSOLIDATED CAR FENDER CO.
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Wendell & MacDuffie Co., General Sales Agents
110 East 42nd St., New York, N. Y.

Nuttall

Nuttall Standard BP Helical Gears

People who use other means of transportation than your street cars do so for two reasons—convenience and comfort. Make your cars more comfortable, easier riding, convenient in design, and they'll not lack for increased patronage.



You can take a big step in the right direction without disorganizing present service and without re-financing — by equipping with Nuttall Helical Gears. They will eliminate all the racking noises and vibration of spur gearing—for Nuttall Helicals mesh like the turning of a screw.

Furthermore the BP Heat Treatment of Nuttall Helicals in itself guarantees at least four times greater gear life, quite apart from savings in maintenance effected through elimination of vibration, and the gears cost you about 70% less in the long run than untreated gears.

MEMBER AMERICAN ELECTRIC RAILWAY ASSOCIATION AERA

R.D. NUTTALL COMPANY
PITTSBURGH PENNSYLVANIA

All Westinghouse Electric & Mfg. Co. District Offices are Sales Representatives In the United States for the Nuttall Electric Railway and Mine Haulage Products. In Canada: Lyman Tube & Supply Co., Ltd., Montreal and Toronto.

USG

Minimize Power Losses without undue wear on the brush or commutator

U. S. G. Brushes accomplish this because they are thoroughly impregnated with graphite.

Each type of brush is especially designed for the service in which it is to operate.

For electric railway service there's a hard, dense type of U. S. G. brush that gives clean commutation with the least possible attention. These brushes wear down very slowly and consequently reduce the cost for brush renewals.

They are particularly recommended for non-interpole and interpole machines of medium and high speeds.

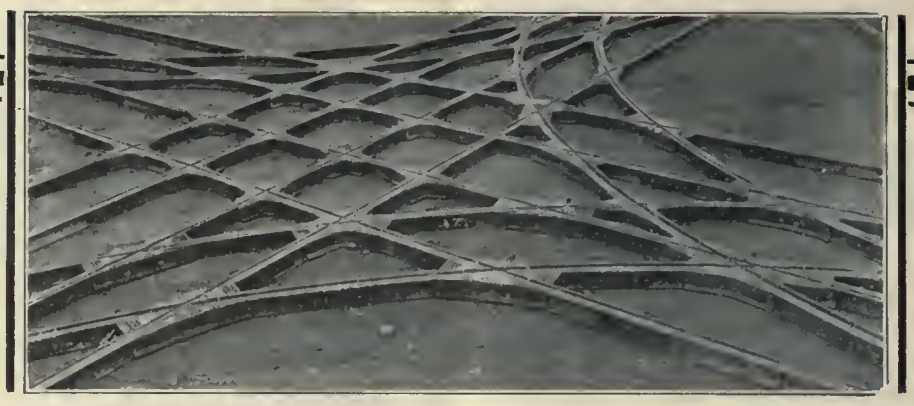
USG

Brushes fill the bill

Manufactured by

The United States Graphite Co.
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New York Philadelphia Pittsburgh
Chicago St. Louis San Francisco



THE STANDARD IN TRACKWORK FOR NEARLY FIFTY YEARS

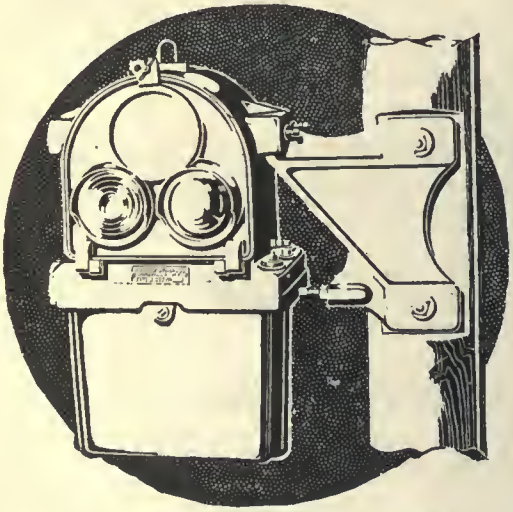
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Automatic Block Signals
To meet every requirement.
Highway Crossing Signals
of proved efficiency.
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TRUCK WITH TOWER IN RUNNING POSITION

TRENTON TOWER

This 3-Section

is not only more convenient, but stronger than the older type.

The top section is reinforced by the intermediate section. The 3-section design makes it possible to raise the platform 16 inches higher and drop it 12 inches lower than can be done with the old-style 2-section tower.

We'll gladly send you details.

J. R. McCARDELL CO.
Trenton, New Jersey, U. S. A.

Simplify Your Materials Storage

Your problem of storing and reclaiming coal, sand, gravel, rock and other loose materials can be reduced to simple terms with a

Sullivan Portable Hoist
and a drag scraper.

One outfit for both storing and reclaiming—no expensive structures—no trestle work—and a power unit that consumes power only when work is being done.

With such simple, yet effective equipment, your storage of materials cannot help but be profitable.



Sullivan Single Drum Electric Hoist



Electric Railways are using Sullivan Portable Hoists for other jobs too, such as setting poles, and erecting transmission towers. These powerful little machines, operated by electric or air motors will lift a ton vertically on single line, or haul a 50-ton freight car on level track. Single and double drum models are available.

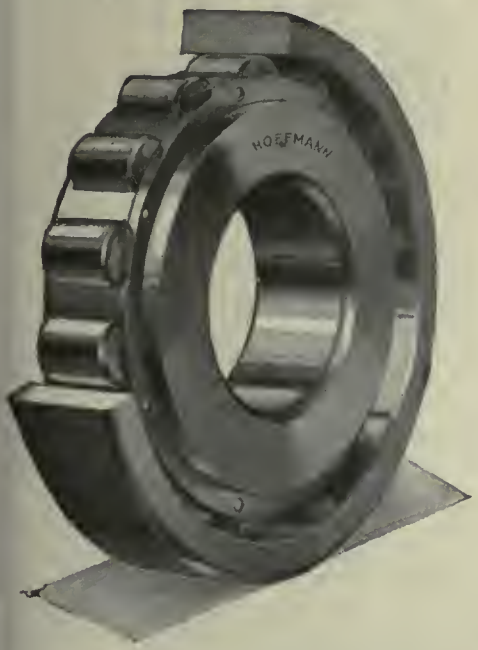
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Electric Hoists—Bulletin 2576-E.
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Sullivan Machinery Company

150 S. Michigan Avenue, Chicago
Branches in All Principal Cities

STAND-UP-ABILITY



Large, solid rollers of heat-treated alloy steel, cylindrical in shape, with a length equal to their diameter—rugged, heavy races of the same tough steel—full-line contact between rollers and races, always—a balanced, machined, cast bronze cage riding on the inner race — precision unequaled, eliminating all looseness, play or vibration—these are the factors explaining the rugged stand-up-ability of the "Hoffmann" Precision Roller Bearing.

Ask for Catalog 904

NORMA-HOFFMANN
BEARINGS CORPORATION
Stamford — Connecticut
PRECISION BALL, ROLLER AND THRUST BEARINGS

"HOFFMANN"

TRIBLOC CHAIN HOISTS



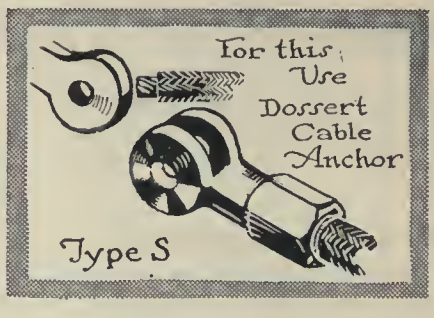
Its "backbone" is strong —and in the right place

Tribloc Chain Hoists afford consistent, satisfactory service under the most gruelling tests because the "backbone"—that small part hidden inside the gear case—possesses a 3½ to 1 factor of safety. No amount of frills will make a hoist serviceable unless this part has strength in the right place. Unstinted effort is expended to maintain this and other Tribloc parts to high standards.

We would like to tell you how and why this effort can be capitalized in your own shop. Ask us to send you Catalog 7-B.

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We also manufacture "THE MOTORBLOC"—
an electrically driven chain hoist.



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—another service best made by the Dossert Tapered Sleeve principle of solderless connection.

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Micanite armature and commutator insulation, commutator segments and rings, plate, tubes, etc., Empire oiled insulating materials; Linotape; Kablak; Mico; and other products—for the electrical insulating requirements of the railway.

Catalogs will gladly be furnished

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Established 1893

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8-F

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INDIVIDUAL items of used equipment, or surplus new equipment, or complete plants, are disposed of (and found) through advertising in the *Searchlight* Section of this paper.

This is the section which so effectively aided the Government in selling the many millions of dollars worth of surplus material and equipment accumulated during the war without disturbing the market.

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You're having brush trouble

CORRECT IT

USE LE CARBONE CARBON BRUSHES

They talk for themselves

COST MORE PER BRUSH
COST LESS PER CAR MILE

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Operating perfectly and requiring minimum attention for maintenance and lubrication, Earll Catchers and Retrievers give genuinely satisfactory results. Their refinement of design, and mechanical superiority are summarized in the following five features, peculiar to Earll construction.

No-wear Check Pawl
Free-Winding Tension Spring
Ratchet Wind
Emergency Release
Perfect Automatic Lubrication

Earll Catchers and Retrievers

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Panchamas

Among the Hindus they grade castes down as low as 5th class—the panchamas—the sweepers—the "untouchables."

A Hindu kid fell in a well and a panchama offered to rescue it, but the parents preferred to let the child drown rather than have it touched by a 5th classer. In every line of endeavor quality can be graded down to a point where the lowest grade is untouchable.

With carbon brushes these grades, starting with Morganite, drop down so considerably with each step that it is positively dangerous to go below the 3rd grade.

Safety first!

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Baltimore, O. T. Hall, Sales Engineer, 437-A Equitable Building.
Revere, Mass., J. F. Drummey, 75 Pleasant Street.
Los Angeles, Special Service Sales Co., 502 Delta Building.
San Francisco, Special Service Sales Co., 202 Russ Building.
Toronto, Can., Railway & Power Engineering Corp., Ltd., 101 Eastern Ave.
Montreal, Can., Railway & Power Engineering Corp., Ltd., 326 Craig St., West.
Winnipeg, Can., Railway & Power Engineering Corp., Ltd., P. O. Box 325.



Clark-Williams Tubular Iron Pole Reinforcing and Extension Clamps

Years can be added to the life of any iron pole which has become corroded at the ground level with our REINFORCING CLAMPS, or added height may be obtained by using the EXTENSION CLAMPS.
ALSO MOUNTS FOR WOOD POLES.

Ask for quotations on your requirements.

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886 Main St., Bridgeport, Conn.

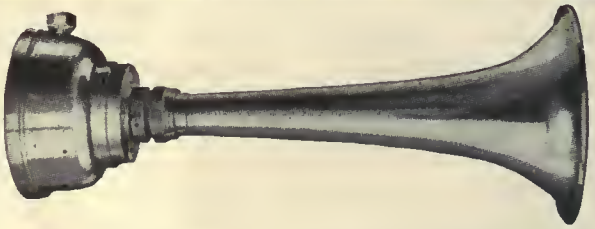
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For Street and Interurban Railways

FOUNDRIES:

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Detroit	Kansas City	Los Angeles
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The Strombos Signal operates on an air pressure of 10 lbs. and over and is controlled by lever valve and cord. It uses only 1/10 the volume of air required by a whistle. It has no moving parts which might fail in the emergency.

Write us for more complete data.

AMERICAN STROMBOS CO.,
INCORPORATED
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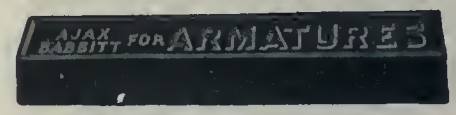
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for *your* passengers?

Not if you use

AJAX BABBITT *for* ARMATURES

keeps the rolling stock rolling



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Established 1880
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Greater Service Per Dollar Invested



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More-Jones "Tiger" Bronze castings for axle and armature-bearing service was one of our early achievements. This is probably the most widely known bronze on the market. It has stood the test of time. There is nothing better for long, efficient and most economical results. Let us quote you.

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There is no substitute for Pantasote

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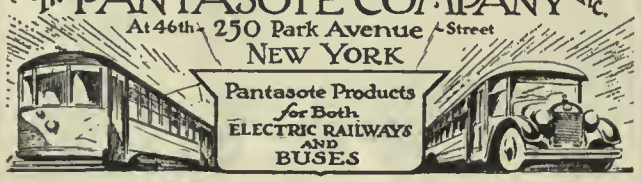
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Roofing—Headlining—Wainscoting

The only homogeneous panel board

standard for electric railway cars and motor buses

The PANTASOTE COMPANY Inc.
At 46th St. 250 Park Avenue NEW YORK



Change a wheel? Change a harp? Change a pole?

Easy!



Easy as filling your pencil with lead

We mean it literally! Any man can change trolley wheels, on a car equipped with Bayonet Trolley Harps, in about 10 seconds—and this without the aid of any tools. Pole changing time, where the Bayonet Trolley Base and Detachable Pole Clamp is used, averages about 30 seconds. That's *real* time-economy for you. And remember, these devices are thoroughly tested and fully approved—the only ones of their kind made.

Also Bayonet Special Trolley Wheels and Sleet Cutters

Bayonet Detachable Trolley Equipment

BAYONET TROLLEY HARP CO.
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Drip Points for Added Efficiency

They prevent creeping moisture and quickly drain the petticoat in wet weather, keeping the inner area dry.

The Above Insulator—No. 72—Voltages—Test—Dry 64,000 Wet 31,400, Line 10,000.

Our engineers are always ready to help you on your glass insulator problem. Write for catalog.

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Electric Railway Automatic Signals
for Accessibility and Reliability
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REG. U.S. PAT. OFF.
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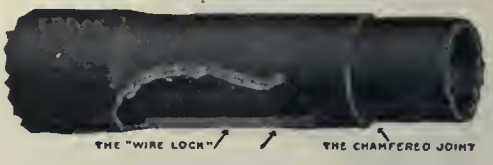
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Boston, 176 Federal: Chicago, 20-32 West Randolph Street: Cincinnati, Traction Bldg.: New York, 100 E. 42nd St.

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Black and Yellow
Varnished Silk, Varnished Cambric, Varnished Paper
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Irvington Varnish & Insulator Co.
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Is the finest cord that science and skill can produce. Its wearing qualities are unsurpassed.
FOR POSITIVE SATISFACTION ORDER SILVER LAKE
If you are not familiar with the quality you will be surprised at its ENDURANCE and ECONOMY.
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Lowest Cost Lightest Weight
Least Maintenance Greatest Adaptability
Catalog complete with engineering data sent on request.
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TULC — A LUBRICANT
We make a specialty of
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We solicit a test of TULC on your equipment
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Cleveland, Ohio
Chicago Representatives: Jameson-Ross Company, Straus Bldg.

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WILLIAM WHARTON JR. & CO., Inc.
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Electrically Welded Joints

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Differential Crane Car
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Builders since 1868 of Water Tube Boilers of continuing reliability

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Makers of Steam Superheaters since 1898 and of Chain Grate Stokers since 1893

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SAN JUAN, Porto Rico, Royal Bank Building



Type R-11
Double Register

International Registers

Made in single and double types to meet requirements of service. For hand or foot, mechanical or electric operation. Counters, car fittings, conductors' punches.

The International Register Co.
15 South Throop Street, Chicago, Illinois

Kalamazoo Trolley Wheels

The value of Kalamazoo Trolley Wheels and Harps has been demonstrated by large and small electric railway systems for a period of thirty years. Being exclusive manufacturers, with no other lines to maintain, it is through the high quality of our product that we merit the large patronage we now enjoy. With the assurance that you pay no premium for quality we will appreciate your inquiries.



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MORE MILES PER DOLLAR WITH THORNTON SIDE BEARING TROLLEY WHEELS



One customer writes—"Have been using your harps and wheels for the past twelve or fifteen months and do not hesitate to say they have given us more miles per dollars invested than any other wheel we have ever used."

Write for References

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Instantaneous Registration by the Passenger of fare collection—ROOKE SYSTEM

Meets every condition for all types of cars and buses. The stand device, as shown, adapts it to one-man uses—making register *portable* or *stationary*, at option. Handles nickels, dimes, quarters, or metal tickets, in *any combination*, FLEXIBILITY with CERTAINTY.



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gives better protection for all exposed metal or woodwork at lowest cost per year.

Many users of Dixon's Paint have certified to its long service records of from five to ten years and even more.

Dixon's Red Lead-Graphite Primer is recommended for priming coats.

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JOSEPH DIXON CRUCIBLE CO.
Jersey City, N. J.
Established 1827



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BOXES for BUSES

Let us tell you of this especially designed box for this class of service.

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COIN COUNTING And Sorting Machines CHANGE CARRIERS Tokens

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ERJ

POSITIONS WANTED

POSITION wanted as inspection or shop foreman, 10 years as armature winder, motor repairman, and acting inspection foreman, will guarantee good results. PW-914, Electric Railway Journal, 1600 Arch St., Phila., Pa.

SUPERINTENDENT transportation. With a wide experience and successful record on city and interurban properties also co-ordination of rail and bus service, successful in handling labor, public relations, etc. Recognized as a transportation official of exceptional ability fully capable of getting results on any property. At present engaged. Personal reasons for desiring change. Best of references. Correspondence invited. Address PW-915, Electric Railway Journal, Guardian Building, Cleveland, Ohio.

Rotary Converters

1—500 kw., 600-v., 833 amp., 900 r.p.m., 6-ph., compound wound Westinghouse Rotary Converter, with 3—165 kva., 60-cy., single ph., 13200 v. primary transformers with A.C. and D.C. panels.

1—300 kw., 600-v., 500 amp., 1200 r.p.m., 6-ph., compound wound interpole Westinghouse Rotary Converter, with 3—110 kva., 60-cy., single ph., 13200-v. primary transformers with A.C. and D.C. panels.

GEO. SACHSENMAIER CO.
926 N. Third St., Philadelphia, Pa.

SAVE 30% TO 50% ON
RAILS-LOCOMOTIVES-CARS
Economy—Service
Quality—Reliability
HYMAN-MICHAELS COMPANY
Peoples Gas Bldg., Chicago
ST. LOUIS — DALLAS — LOS ANGELES
SAN FRANCISCO — PORTLAND — SEATTLE

"Opportunity" Advertising:

Think *"SEARCHLIGHT"* First!

G-02

FOR SALE
30 Birney Safety Cars
Brill Built
West. 508 or G. E. 264 Motors. Cars Complete—Low Price—Fine Condition.

ELECTRIC EQUIPMENT CO.
Commonwealth Bldg., Philadelphia, Pa.

Today's Prices Are Highest

Let "Searchlight" Help You

The quicker idle equipment is sold, the higher the selling price it can demand—today's prices are always highest because—

Equipment permitted to remain unused depreciates rapidly and occupies valuable space. Every day of idleness brings down the possible selling price.

"Searchlight" Locates Quick Buyers

The wise owner of idle equipment promptly informs the field of his desire to sell through an advertisement in the Searchlight Section, where he knows that those who might need what he has will be most likely to look first.

WHAT AND WHERE TO BUY

Advertising Agencies
Doyle Kitchen & McCormick

Advertising, Street Car
Collier, Inc., Barron G.

Air Brakes
Christensen Air Brake Co.
Westinghouse Air Brake Co.

Air Receivers & Aftercoolers
Ingersoll-Rand Co.

Anchors, Guy
Elec. Service Supplies Co.
Ohio Brass Co.
Westinghouse E. & M. Co.

Appraisals
American Appraisal Co.

Armature Shop Tools
Elec. Service Supplies Co.
Columbia Machine Works

Automatic Return Switch Stands
Ramapo Ajax Corp.

Automatic Safety Switch Stands
Ramapo Ajax Corp.

Axles
Bemis Car Truck Co.
Bethlehem Steel Co.
Brill Co., The J. G.
Carnegie Steel Co.
Johnson & Co., J. R.
National Railway Appliance Co.
Standard Steel Works
Westinghouse E. & M. Co.

Axles, Carbon Vanadium
Johnson & Co., J. R.

Axles (Front & Rear) Motor Truck & Passenger Car
Timken-Detroit Axle Co., The

Axles, Steel
Bethlehem Steel Co.
Carnegie Steel Co.
Johnson & Co., J. R.

Axles, Trailer & Motor Bus
Timken-Detroit Axle Co., The

Babbitt Metal
Ajax Metal Company
Johnson & Co., J. R.
More-Jones Brass & Metal Co.

Babbitting Devices
Columbia Machine Wks.

Badges and Buttons
Elec. Service Supplies Co.
International Register Co.

Bearings, Anti-Friction
Hyatt Roller Bearing Co.

Bearings and Bearing Metals
Ajax Metal Company
Bemis Car Truck Co.
Brill Co., The J. G.
Columbia Machine Wks.
General Electric Co.
More-Jones Brass & Metal Co.
Westinghouse E. & M. Co.

Bearings, Center and Roller Side
Columbia Machine Works
Stucki Co., A.

Bearings, Roller and Ball
Hyatt Roller Bearing Co.
Norma Hoffman Bearing Corp.

Bells & Buzzers
Consolidated Car Heating Co.

Bells and Gongs
Brill Co., The J. G.
Columbia Machine Wks.
Elec. Service Supplies Co.

Benders, Rail
Railway Trackwork Co.

Bodies, Bus
Cummings Car & Coach Co.

Body Material—Haskelite & Plymetl
Haskelite Mfg. Corp.

Boilers
Babcock & Wilcox Co.

Bolts, Nuts, Rivets
Russell Burdsall & Ward Bolt & Nut Co.

Bond Testers
Amer. Steel & Wire Co.
Elec. Service Supplies Co.

Bonding Apparatus
Amer. Steel & Wire Co.
Electric Railway Improvement Co.
Elec. Service Supplies Co.
Ohio Brass Co.
Railway Trackwork Co.
Una Welding & Bonding Co.

Bonds, Rail
American Steel & Wire Co.
Electric Railway Improvement Co.
Elec. Service Supplies Co.
General Electric Co.
Ohio Brass Co.
Railway Trackwork Co.
Una Welding & Bonding Co.
Westinghouse E. & M. Co.

Brackets and Cross Arms (See also Poles, Ties, Posts, etc.)
Bates Expanded Steel Truss Co.
Columbia Machine Works
Electric Ry. Equipment Co.
Elec. Service Supplies Co.
Hubbard & Co.
Ohio Brass Co.

Brake Adjusters
Brill Co., The J. G.
National Ry. Appliance Co.
Westinghouse Tr. Br. Co.

Brake Shoes
Bemis Car Truck Co.
Brill Co., The J. G.

Brakes, Brake Systems and Brake Parts
Bemis Car Truck Co.
Brill Co., The J. G.
Columbia Machine Wks.
General Electric Co.
National Brake Co.
Safety Car Devices Co.
Westinghouse Traction Brake Co.

Brushes, Carbon
General Electric Co.
Jeandron, W. J.
Le Carbone Co.
Morganite Brush Co.
U. S. Graphite Co.
Westinghouse E. & M. Co.

Brushes, Graphite
Morganite Brush Co.
U. S. Graphite Co.

Brushes, Wire Pneumatic
Ingersoll-Rand Co.

Brush Holders
Columbia Machine Works

Bulkheads
Haskelite Mfg. Corp.

Bus Seats
Hale-Kilburn Co.
Heywood-Wakefield Co.

Buses, Motor
American Car & Foundry Motors Co.
Brill Co., The J. G.
Cummings Car & Coach Co.
Fageol Motor Co.
Graham Brothers
International Motor Co.
Mack Trucks, Inc.
Six Wheel Co.

Bushings, Case Hardened and Manganese
Bemis Car Truck Co.
Brill Co., The J. G.
Columbia Machine Works

Cables (See Wires and Cables)

Cambric Tapes, Yellow and Black Varnished
Irvington Varnish & Ins. Co.
Mica Insulator Co.

Carbon Brushes (See Brushes, Carbon)

Car Lighting Fixtures
Elec. Service Supplies Co.

Car Panel Safety Switches
Consolidated Car Heating Co.
Westinghouse E. & M. Co.

Car Wheels, Rolled Steel
Bethlehem Steel Co.

Cars, Dump
Brill Co., The J. G.
Differential Steel Car Co.

Cars, Gas, Rail
Brill Co., The J. G.

Cars, Passenger, Freight, Express, etc.
Amer. Car Co.
Brill Co., The J. G.
Cummings Car & Coach Co.
Kuhlman Car Co., G. C.
National Ry. Appliance Co.
Wason Mfg. Co.

Cars, Second Hand
Electric Equipment Co.

Cars, Self-Propelled
Brill Co., The J. G.
General Electric Co.

Castings, Brass, Composition or Copper
Ajax Metal Company
Anderson Mfg. Co., A. & J. M.
Columbia Machine Wks.
More-Jones Brass & Metal Co.

Castings, Gray Iron and Steel
American Steel Foundries.
Bemis Car Truck Co.
Columbia Machine Wks.
Standard Steel Works
Wm. Wharton, Jr. & Co., Inc.

Castings, Malleable & Brass
Bemis Car Truck Co.
Columbia Machine Wks.

Catchers and Retrievers, Trolley
Earll, C. I.
Elec. Service Supplies Co.
Ohio Brass Co.
Wood Co., Chas. N.

Catenary Construction
Archbold-Brady Co.

Ceiling Car
Haskelite Mfg. Corp.
Pantasote Co., Inc.

Ceilings, Plywood Panels
Haskelite Mfg. Corp.

Chairs, Parlor Car
Heywood-Wakefield Co.

Change Carriers
Cleveland Fare Box Co.
Electric Service Supplies Co.

Circuit-Breakers
Anderson Mfg. Co., A. & J. M.
General Electric Co.
Westinghouse E. & M. Co.

Clamps and Connectors for Wires and Cables
Columbia Machine Works
Dossert & Co.
Elec. Ry. Equipment Co.
Elec. Ry. Improvement Co.
Elec. Service Supplies Co.
General Electric Co.
Hubbard & Co.
Ohio Brass Co.
Westinghouse E. & M. Co.

Cleaners and Scrapers, Track (See also Snow-Plows, Sweepers and Brooms)
Brill Co., The J. G.
Ohio Brass Co.

Clusters and Sockets
General Electric Co.

Coal and Ash Handling (See Conveying and Hoisting Machinery)

Coil Banding and Winding Machines
Columbia Machine Wks.
Elec. Service Supplies Co.
Westinghouse E. & M. Co.

Coils, Armature and Field
Columbia Machine Wks.
General Electric Co.
Westinghouse E. & M. Co.

Coils, Choke and Kicking
Elec. Service Supplies Co.
General Electric Co.
Westinghouse E. & M. Co.

Coin Counting Machines
Cleveland Fare Box Co.
International Register Co.

Coin Sorting Machines
Cleveland Fare Box Co.

Coin Wrappers
Cleveland Fare Box Co.

Commutator Slotters
Columbia Machine Works
Elec. Service Supplies Co.
General Electric Co.
Westinghouse E. & M. Co.
Wood Co., Chas. N.

Commutator Truing Devices
General Electric Co.

Commutators or Parts
Cameron Elec'l Mfg. Co.
Columbia Machine Wks.
General Electric Co.
Westinghouse E. & M. Co.

Compressors, Air
General Electric Co.
Ingersoll-Rand Co.
Sullivan Machinery Co.
Westinghouse Tr. Br. Co.

Compressors, Air, Portable
Ingersoll-Rand Co.
Sullivan Machinery Co.

Compressors, Gas
Sullivan Machinery Co.

Condensers
General Electric Co.
Ingersoll-Rand Co.
Westinghouse E. & M. Co.

Condenser Papers
Irvington Varnish & Ins. Co.

Connectors, Solderless
Dossert & Co.
Westinghouse E. & M. Co.

Connectors, Trailer Car
Columbia Machine Works
Consolidated Car Heating Co.
Elec. Service Supplies Co.
Ohio Brass Co.

Controllers or Parts
Columbia Machine Wks.
General Electric Co.
Westinghouse E. & M. Co.

Controller Regulators
Elec. Service Supplies Co.

Controlling Systems
General Electric Co.
Westinghouse E. & M. Co.

Converters, Rotary
General Electric Co.
Westinghouse E. & M. Co.

Copper Wire
American Brass Co.
Anaconda Copper Mining Co.
Rome Wire Co.

Copper Wire Instruments Measuring Testing and Recording
American Brass Co.
American Steel & Wire Co.
Anaconda Copper Mining Co.

Cord, Bell, Trolley, Register
Brill Co., The J. G.
Elec. Service Supplies Co.
International Register Co.
Roebling's Sons Co., J. A.
Samson Cordage Works
Silver Lake Co.

Cord Connectors and Couplers
Elec. Service Supplies Co.
Samson Cordage Works
Wood Co., Chas. N.

Couplers, Car
American Steel Foundries
Brill Co., The J. G.
Ohio Brass Co.
Westinghouse Tr. Br. Co.

Cranes, Hoist & Lift
Electric Service Supplies Co.

Cross Arms (See Brackets)

Crossing Foundations
International Steel Tie Co.

Crossings
Ramapo Ajax Corp.
Wm. Wharton Jr. & Co., Inc.

Crossing, Frog and Switch
Ramapo Ajax Corp.
Wm. Wharton, Jr. & Co., Inc.

Crossing Manganese
Bethlehem Steel Co.
Ramapo Ajax Corp.
Wm. Wharton Jr. & Co., Inc.

Crossings, Track (See Track Special Work)

Crossings, Trolley
Ohio Brass Co.
Westinghouse E. & M. Co.

Curtains & Curtain Fixtures
Brill Co., The J. G.
Morton Mfg. Co.
Pantasote Co., Inc.

Dealer's Machinery & Second Hand Equipment
Elec. Equipment Co.
Hyman Michaels Co.
Sachsenmaier Co., Geo.
Salzberg Co., Inc., H. E.

Derailing Devices (See also Track Work)

Derailing Switches
Ramapo Ajax Corp.

Destination Signs
Columbia Machine Wks.
Electric Service Supplies Co.

Detective Service
Wish-Service, P. Edward

Door Operating Devices
Brill Co., The J. G.
Consolidated Car Heating Co.
Nat'l Pneumatic Co., Inc.
Safety Car Devices Co.

Doors and Door Fixtures
Brill Co., The J. G.
General Electric Co.
Hale-Kilburn Co.

Doors, Folding Vestibule
Nat'l Pneumatic Co., Inc.
Safety Car Devices Co.

Drills, Rock
Sullivan Machinery Co.

Drills, Track
Amer. Steel & Wire Co.
Elec. Service Sup. Co.
Ingersoll-Rand Co.
Ohio Brass Co.

Dryers, Sand
Elec. Service Supplies Co.
Ohio Brass Co.
Westinghouse E. & M. Co.

Ears
Columbia Machine Works
Electric Service Supplies Co.
Ohio Brass Co.
Westinghouse E. & M. Co.

Electric Grinders
Railway Trackwork Co.

Electrical Wires and Cables
Amer. Electrical Works
American Steel & Wire Co.
Roebling's Sons Co., John A.
Rome Wire Co.

Electrodes, Carbon
Railway Trackwork Co.
Una Welding & Bonding Co.

Electrodes, Steel
Railway Trackwork Co.
Una Welding & Bonding Co.

Engineers, Consulting, Contracting and Operating
Allison & Co., J. S.
Archbold-Brady Co.
Beeler, John A.
Bibbins, J. Rowland
Buchanan & Layng Corp.
Day & Zimmermann, Inc.
Drum & Co., A. L.
Ford, Bacon & Davis
Hemphill & Wells
Hoist, Engelhardt W.
Jackson, Walter
Kelker & DeLeuw
Kelly Cooke & Co.
McClellan & Junkersfeld
Richey, Albert S.
Sanderson & Porter
Stevens & Wood, Inc.
Stone & Webster
White Eng. Corp., The J. G.

Engines, Gas, Oil or Steam
Ingersoll-Rand Co.
Westinghouse E. & M. Co.

Exterior Side Panels
Haskelite Mfg. Corp.

Fare Boxes
Cleveland Fare Box Co.
Nat'l Ry. Appliance Co.
Perey Mfg. Co., Inc.

Fare Registers
Electric Service Sup. Co.

Fences, Woven Wire and Fence Posts
Amer. Steel & Wire Co.

Fenders and Wheel Guards
Brill Co., The J. G.
Consolidated Car Fender Co.
Star Brass Works
Wood Co., Chas. N.

Fibre and Fibre Tubing
Westinghouse E. & M. Co.

Field Coils (See Coils)

Finishing Materials
Egyptian Lacquer Mfg. Co.
Valentine & Co.

Flaxlinum Insulators
Nat'l Ry. Appliance Co.

Floodlights
Elec. Service Supplies Co.

Floor, Sub.
Haskelite Mfg. Corp.

Floors
Haskelite Mfg. Corp.

Forgings
Brill Co., The J. G.
Carnegie Steel Co.
Standard Steel Works

Frogs & Crossings, Tee Rail
Bethlehem Steel Co.
Ramapo Ajax Corp.
Wm. Wharton Jr. & Co., Inc.

Frogs, Track (See Track Work)

Frogs, Trolley
Electric Service Supplies Co.
Ohio Brass Co.
Westinghouse E. & M. Co.

Funnell Castings
Wm. Wharton, Jr. & Co., Inc.

Fuses and Fuse Boxes
Columbia Machine Wks.
Consolidated Car Heating Co.
General Electric Co.
Westinghouse E. & M. Co.

Fuses, Refillable
General Electric Co.

Gaskets, Asbestos
Westinghouse Tr. Br. Co.

Gas-Electric Cars
General Electric Co.
Westinghouse E. & M. Co.

Gas Producers
Westinghouse E. & M. Co.

Gates, Car
Brill Co., The J. G.

Gauges, Oil & Water
Ohio Brass Co.

Gear Blanks
Bethlehem Steel Co.
Brill Co., The J. G.
Carnegie Steel Co.
Standard Steel Works

Gear Cases
Chillingworth Mfg. Co.
Columbia Machine Wks.
Elec. Service Supplies Co.
Westinghouse E. & M. Co.

Gears and Pinions
Bemis Car Truck Co.
Bethlehem Steel Co.
Columbia Machine Wks.
Electric Service Supplies Co.

(Continued on page 66)

Portable Air Power Units



For Paving Breaking and Tie Tamping

Ingersoll-Rand Portable Air Compressors and Tools account for important savings in track work.

The Paving Breakers save from 60% to 75% of the time and labor required by hand methods for tearing up pavement or breaking out heavy concrete foundations.

The Pneumatic Tampers enable four men to do more and better work than twelve to sixteen men using hand picks and bars. Furthermore, Pneumatic Tampers make a more uniform track—one which stands up twice as long as that tamped by hand.

Ask for complete data on the savings these power units are making on different roads.

INGERSOLL-RAND COMPANY-11 BROADWAY, NEW YORK CITY.

Offices in principal cities the world over

FOR CANADA REFER-CANADIAN INGERSOLL-RAND CO. LIMITED, 260 ST. JAMES STREET, MONTREAL, QUEBEC.

225-TT

Ingersoll-Rand

General Electric Co.
Nat'l Ry. Appliance Co.
Nuttall Co., R. D.
Tool Steel Gear & Pinion Co.

Generating Sets, Gas-Electric
General Electric Co.

Generators
General Electric Co.
Leece Neville Co.
Westinghouse E. & M. Co.

Girder Rails
Bethlehem Steel Co.
Lorain Steel Co.

Gongs (See Bells and Gongs)

Greases (See Lubricants)

Grinders and Grinding Supplies
Metal & Thermit Corp.
Railway Trackwork Co.

Grinders, Portable
Railway Trackwork Co.

Grinders, Portable Electric
Railway Trackwork Co.

Grinding Bricks and Wheels
Railway Trackwork Co.

Guard Rail Clamps
Ramapo Ajax Corp.
Wm. Wharton, Jr. & Co., Inc.

Guard Rails, Tee Rail and Manganese
Ramapo Ajax Corp.
Wm. Wharton, Jr. & Co., Inc.

Guards, Trolley
Elec. Service Sup. Co.
Ohio Brass Co.

Hammers, Pneumatic
Ingersoll-Rand Co.

Harps, Trolley
Bayonet Trolley Harp Co.
Columbia Machine Works
Elec. Service Supplies Co.
More-Jones Brass & Metal Co.
Nuttall Co., R. D.
Star Brass Works
Thornton Trolley Wheel Co.

Headlights
Elec. Service Supplies Co.
General Electric Co.
Ohio Brass Co.

Headlining
Columbia Machine Works
Haskelite Mfg. Corp.
Pantasote Co., Inc.

Heaters, Car (Electric)
Consolidated Car Heating Co.
Gold Car Heat. & Light. Co
Nat'l Ry. Appliance Co.
Smith Heater Co., Peter

Heaters, Car, Hot Air and Water
Smith Heater Co., Peter

Heaters, Car, Stove
Smith Heater Co., Peter

Helmets—Welding
Railway Trackwork Co.
Una Welding & Bonding Co.

Hoists and Lifts
Columbia Machine Wks.
Ford Chain Block Co.

Hoists, Portable
Ingersoll-Rand Co.
Sullivan Machinery Co.

Horns, Car
American Strombos Co.

Hose, Bridges
Ohio Brass Co.

Hose, Pneumatic
Westinghouse Traction Brake Co.

Ignition Units
Leece Neville Co.

Instruments, Measuring, Testing and Recording
American Steel & Wire Co.
General Electric Co.
Westinghouse E. & M. Co.

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General Electric Co.
Irvington Varnish & Ins. Co.
Mica Insulator Co.
Okonite Co.
Okonite-Callender Cable Co. Inc.
U. S. Rubber Co.
Westinghouse E. & M. Co.

Insulating Silk
Irvington Varnish & Ins. Co.

Insulating Varnishes
Irvington Varnish & Ins. Co.

Insulation (See also Paints)
Electric Ry. Equipment Co.
Electric Service Sup. Co.
General Electric Co.
Irvington Varnish & Ins. Co.
Mica Insulator Co.
Okonite Co.
Okonite-Callender Cable Co. Inc.
U. S. Rubber Co.
Westinghouse E. & M. Co.

Insulation Slot
Irvington Varnish & Ins. Co.

Insulator Pins
Elec. Service Supplies Co.
Hubbard & Co.

Insulators (See also Line Material)
Elec. Ry. Equipment Co.
Elec. Service Supplies Co.
General Electric Co.
Hemingray Glass Co.
Irvington Varnish & Ins. Co
Ohio Brass Co.
Westinghouse E. & M. Co.

Interior Side Linings
Haskelite Mfg. Corp.

Interurban Cars (See Cars Passenger, Freight Express etc.)

Jacks (See also Cranes, Hoists and Lifts)
Buda Co.
Columbia Machine Wks.
Elec. Service Supplies Co.
National Railway Apliance Co.

Joints, Rail (See Rail Joints)

Journal Boxes
Bemis Car Truck Co.
Brill Co., The J. G.

Lacquer Finishes
Egyptian Lacquer Mfg. Co.
Valentine & Co.

Lamps, Guards and Fixtures
Elec. Service Sup. Co.
General Electric Co.
Westinghouse E. & M. Co.

Lamps, Arc and Incandescent (See also Headlights)
General Electric Co.
Westinghouse E. & M. Co.

Lamps, Signal and Marker
Elec. Service Supplies Co.
Nichols-Lintern Co.
Ohio Brass Co.

Lanterns, Classification
Nichols-Lintern Co.

Letter Boards
Haskelite Mfg. Corp.

Lighting Systems
Leece Neville Co.

Lightning Protection
Electric Service Sup. Co.
General Electric Co.
Ohio Brass Co.
Westinghouse E. & M. Co.

Line Material (See also Brackets, Insulators, Wires, etc.)
Dossert & Co.
Electric Ry. Equipment Co.
Electric Service Sup. Co.
General Electric Co.
Hubbard & Co.
More-Jones Brass & Metal Co.
Ohio Brass Co.
Westinghouse E. & M. Co.

Locking Spring Boxes
Wm. Wharton, Jr. & Co., Inc.

Locomotives, Electric
Cummings Car & Coach Co.
General Electric Co.
Westinghouse E. & M. Co.

Locomotives, Oil Engine Electric Driven
Ingersoll-Rand Co.

Lubricating Engineers
Standard Oil Co. of Indiana
Texas Company
Universal Lubricating Co.

Lubricants, Oil and Grease
Standard Oil Co. of Indiana
Texas Company
Universal Lubricating Co.

Machinery, Insulating
Amer. Insulating Mach. Co.

Manganese Parts
Bemis Car Truck Co.

Manganese Steel Castings
Wm. Wharton, Jr. & Co., Inc.

Manganese Steel Guard Rails
Ramapo Ajax Corp.
Wm. Wharton, Jr. & Co., Inc.

Manganese Steel, Special Track Work
Bethlehem Steel Co.
Ramapo Ajax Corp.
Wm. Wharton Jr. & Co., Inc.

Manganese Steel Switches, Frogs and Crossings
Bethlehem Steel Co.
Ramapo Ajax Corp.
Wm. Wharton, Jr. & Co., Inc.

Meters (See Instruments)

Mica
Mica Insulator Co.

Motor Buses (See Buses, Motor)

Motor and Generator Sets
General Electric Co.

Motor Leads
Dossert & Co.

Motors, Electric
General Electric Co.
Westinghouse E. & M. Co.

Motorman's Seats
Brill Co., The J. G.
Electric Service Sup. Co.
Hale-Kilburn Co.
Heywood-Wakefield Co.
Wood Co., Chas. N.

Nuts and Bolts
Bemis Car Truck Co.
Bethlehem Steel Co.
Hubbard & Co.

Oils (See Lubricants)

Omnibuses (See Buses, Motor)

Oxy-Acetylene (See Cutting Apparatus Oxy-Acetylene)

Oxygen
International Oxygen Co.

Packing
U. S. Rubber Co.
Westinghouse Traction Brake Co.

Paints and Varnishes (Insulating)
Electric Service Sup. Co.
Irvington Varnish & Ins. Co.
Mica Insulator Co.
National Ry. Appliance Co.

Paints & Varnishes, Preservative
Joseph Dixon Crucible Co.

Panels, Outside, Inside
Haskelite Mfg. Corp.

Pavement Breakers
Ingersoll-Rand Co.
Sullivan Machinery Co.

Pickups, Trolley Wire
Elec. Service Supplies Co.
Ohio Brass Co.

Pinion Pullers
Elec. Service Supplies Co.
General Electric Co.
Wood Co., Chas. N.

Pinions (See Gears)

Pins, Case Hardened, Wood and Iron
Bemis Car Truck Co.
Ohio Brass Co.
Westinghouse Tr. Brake Co.

Pipe Fittings
Standard Steel Works
Westinghouse Tr. Brake Co.

Planers (See Machine Tools)

Plates for Tee Rail Switches
Ramapo Ajax Corp.

Pliers, Rubber Insulated
Electric Service Sup. Co.
National Railway Appliance Co.

Plywood, Roofs, Headlining Floors, Interior Panels, Bulkheads, Truss Planks
Haskelite Mfg. Corp.

Pneumatic Tools
Ingersoll-Rand Co.

Pole Clamps
Clark-Williams Eng. Co.

Pole Line Hardware
Bethlehem Steel Co.
Electric Service Sup. Co.
Ohio Brass Co.

Poles, Metal Street
Bates Expanded Steel Truss Co.
Elec. Ry. Equipment Co.
Hubbard & Co.

Pole Mountings
Clark-Williams Eng. Co.

Pole Reinforcing
Hubbard & Co.

Poles and Ties Treated
Amer. Creosoting Co.
Bell Lumber Co.

Poles, Ties, Posts, Piling and Lumber
Amer. Creosoting Co.
Bell Lumber Co.
Naugle Pole & Tie Co.

Poles, Trolley
Bayonet Trolley Harp Co.
Bell Lumber Co.
Electric Service Sup. Co.
Nuttall Co., R. D.

Poles, Tubular Steel
Elec. Ry. Equipment Co.
Electric Service Sup. Co.

Portable Grinders
Buda Co.

Potheads
Okonite Co.
Okonite-Callender Cable Co. Inc.

Power Saving Devices
National Ry. Appliance Co.

Pressure Regulators
General Electric Co.
Ohio Brass Co.
Westinghouse E. & M. Co.
Westinghouse Traction Brake Co.

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Ingersoll-Rand Co. (A. S. Cameron Steam Pump Wks).

Pumps, Air Lift
Sullivan Machinery Co.

Pumps, Vacuum
A. S. Cameron Steam Pump Wks. (Ingersoll-Rand Co.)
Ingersoll-Rand Co. (A. S. Cameron Steam Pump Wks.)
Sullivan Machinery Co.

Punches, Ticket
International Register Co.
Wood Co., Chas. N.

Rail Braces and Fastenings
Ramapo Ajax Corp.

Rail Grinders (See Grinders)

Rail Joints
Carnegie Steel Co.
Rail Joint Co.

Rail Joints—Welded
Lorain Steel Co.
Metal & Thermit Corp.

Rails, Steel
Bethlehem Steel Co.
Carnegie Steel Co.

Rail Welding
Metal & Thermit Corp.
Railway Trackwork Co.
Una Welding & Bonding Co.

Railway Paving Guards, Steel
Godwin Co., Inc., W. S.

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Consolidated Car Heating Co.
Westinghouse E. & M. Co.

Rattan
Brill Co., The J. G.
Cummings Car & Coach Co.
Electric Service Sup. Co.
Hale-Kilburn Co.
Heywood-Wakefield Co.

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Electric Service Sup. Co.
International Register Co.
Rooke Automatic Register Co.

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Amer. Steel & Wire Co.
Bethlehem Steel Co.
Carnegie Steel Co.

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Elec. Service Supplies Co.

Repair Work (See also Coils)
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Westinghouse E. & M. Co.

Replacers, Car
Electric Service Sup. Co.

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Consolidated Car Heating Co.

Resistance, Wire and Tube
American Steel & Wire Co.
General Electric Co.
Westinghouse E. & M. Co.

Retrievers, Trolley (See Catchers and Retrievers, Trolley)

Rheostats
General Electric Co.
Mica Insulator Co.
Westinghouse E. & M. Co.

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Hyatt Roller-Bearing Co.

Roofing, Car
Haskelite Mfg. Corp.
Pantasote Co., Inc.

Roofs, Car & Bus
Haskelite Mfg. Corp.

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Safety Car Devices Co.

Sanders, Track
Brill Co., The J. G.
Electric Service Sup. Co.
Nichols-Lintern Co.
Ohio Brass Co.

Sash Fixtures, Car
Brill Co., The J. G.

Sash, Metal, Car Window
Hale-Kilburn Co.

Scrapers, Track (See Cleaners and Scrapers, Track)

Screw Drivers, Rubber Insulated
Electric Service Sup. Co.

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Hale-Kilburn Co.
Haskelite Mfg. Corp.
Heywood-Wakefield Co.
Pantasote Co., Inc.

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Brill Co., The J. G.
Hale-Kilburn Co.
Heywood-Wakefield Co.

Seats, Car (See also Rattan)
Brill Co., The J. G.
Hale-Kilburn Co.
Heywood-Wakefield Co.

Second Hand Equipment
Electric Equipment Co.
Hyman-Michaels Co.
Saxhenmaier Co., Geo.
Salzberg Co., Inc., H. E.

Shades, Vestibule
Brill Co., The J. G.

Shovels
Brill Co., The J. G.
Hubbard & Co.

Shovels, Power
Brill Co., The J. G.

Side Bearings (See Bearings Center and Side

Signals, Car Starting
Consolidated Car Heating Co.
Electric Service Sup. Co.
Nat'l Pneumatic Co., Inc.

Signal Systems, Block
Electric Service Sup. Co.
Nachod & U. S. Signal Co.
Wood Co., Chas. N.

Signal Systems, Highway Crossing
Nachod & U. S. Signal Co.

Signals, Indicating
Nichols-Lintern Co.

Slack Adjusters (See Brake Adjusters)

Slag
Carnegie Steel Co.,

Sleet Wheels and Cutters
Anderson Mfg. Co., A. & J. M.
Bayonet Trolley Harp Co.
Columbia Machine Wks.
Elec. Ry. Equipment Co.
Elec. Ry. Improvement Co.
Electric Service Sup. Co.
More-Jones Brass & Metal Co.
Nuttall Co., R. D.

Smokestacks, Car
Nichols-Lintern Co.

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Brill Co., The J. G.
Columbia Machine Wks.
Consolidated Car Fender Co.
Cummings Car & Coach Co.

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Heywood-Wakefield Co.

Soldering and Brazing Apparatus (See Welding Processes and Apparatus)

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Irvington Varnish & Ins. Co.

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Lorain Steel Co.
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Amer. Steel & Wire Co.

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Westinghouse E. & M. Co.

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Amer. Steel & Wire Co.
Bemis Car Truck Co.
Brill Co., The J. G.
Standard Steel Works

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Brill Co., The J. G.
Cummings Car & Coach Co.

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Morton Mfg. Co.

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Morton Mfg. Co.

Steel Flooring
Morton Mfg. Co.

Steps, Car
Brill Co., The J. G.
Morton Mfg. Co.

Stokers, Mechanical
Babcock & Wilcox Co.
Westinghouse E. & M. Co.

Stop Signals
Nichols-Lintern Co.

Storage Batteries (See Batteries, Storage)

Strain, Insulators
Anderson Mfg. Co., A. & J. M.
Electric Service Supplies Co.
Ohio Brass Co.
Westinghouse E. & M. Co.

Strand
American Steel & Wire Co.
Roebling's Sons Co., J. A.

Street Cars (See Cars, Passenger, Freight, Express, etc.)

Superheaters
Babcock & Wilcox Co.

Sweepers, Snow (See Snow Plows, Sweepers and Brooms)

Switch Stands and Fixtures
Ramapo Ajax Corp.

Switches and Switchboards
Consolidated Car Heating Co.
Electric Service Sup. Co.
General Electric Co.
Westinghouse E. & M. Co.

Switches, Selector
Nichols-Lintern Co.

Switches, Tee Rail
Ramapo Ajax Corp.

Switches, Track (See Track Special Work)

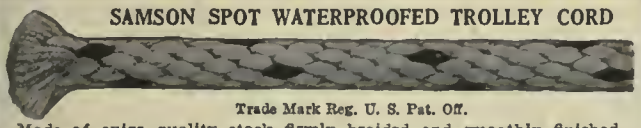
Tampers, Tie
Ingersoll-Rand Co.
Railway Trackwork Co.

Tapes and Cloths (See Insulating Cloth, Paper and Tape)

Tee Rail Special Track Work
Bethlehem Steel Co.
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(Continued on page 68)

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ALPHABETICAL INDEX TO ADVERTISEMENTS

Page

A

Ajax Metal Co., The..... 58
Allison & Co., J. E..... 22
American Appraisal Co., The... 24
American Brass Co., The..... 47
American Car Co..... 69
American Car and Foundry Motors Co. 29
American Creosoting Co..... 49
American Electrical Works..... 60
American Insulating Mach. Co.. 60
American Steel Foundries 6
American Steel & Wire Co.... 61
American Strombos Co..... 58
Anaconda Copper Mining Co... 47
Anderson Mfg. Co., Albert & J. M. 52
Archbold-Brady Co..... 23

B

Babcock & Wilcox Co..... 62
Bates Expanded Steel Truss Co. 45
Bayonet Trolley Harp Co..... 59
Beeler Organization, The..... 22
Bell Lumber Co..... 67
Bemis Car Truck Co..... 34
Bethlehem Steel Co..... 43
Bibbins, J. Rowland 22
Brill Co., The J. G..... 69
Buchanan & Layng Corporation. 22
Buda Co., The 54

C

Cameron Electrical Mfg. Co.... 67
Carnegie Steel Co..... 61
Chillingworth Mfg. Co..... 67
Clark-Williams Engineering Co.. 58
Cleveland Fare Box Co., The... 62
Collier, Inc., Barron G..... 48
Columbia Machine Works..... 51
Consolidated Car Fender Co., The. 52
Consolidated Car Heating Co... 67
Christensen Air Brake Co..... 17
Cummings Car & Coach Co.... 37

D

Day & Zimmermann, Inc..... 22
Differential Steel Car Co., The.. 61
Dixon Crucible Co., Joseph..... 62
Dossert & Co..... 56
Drum & Co., A. L..... 22

Page

E

Earll, C. I..... 57
Egyptian Lacquer Mfg. Co., The. 32
Electric Equipment Co..... 63
Electric Railway Equipment Co. 60
Electric Railway Improvement Co. 67
Electric Service Supplies Co.... 7

F

Fageol Motors Co..... 29
Fisk Tire Co., Inc., The..... 26
Ford, Bacon & Davis, Inc..... 22
Ford Chain Block Co..... 56
"For Sale" Ads 63

G

General Electric Co..20, Back Cover
General Tire & Rubber Co., The. 28
Globe Ticket Co..... 16
Gold Car Heating & Ltg. Co.... 67
Graham Bros. 27
Griffin Wheel Co..... 58

H

Hale-Kilburn Co. 10
Haskelite Mfg. Corp..... 23
"Help Wanted" Ads..... 63
Hemingray Glass Co..... 59
Hemphill & Wells 22
Heywood-Wakefield Co. 18
Hoist, Englehardt W..... 22
Hubbard & Co..... 61
Hyatt Roller Bearing Co., Insert 35, 36
Hyman-Michaels Co..... 63

I

Ingersoll-Rand Co..... 65
International Motor Co., Inc..14-15
International Oxygen Co..... 67
International Register Co..... 62
International Steel Tie Co., Front Cover
Irvington Varnish & Insulator Co..... 60

J

Jackson, Walter 22
Jeandron, W. J..... 57
Johnson & Co., J. R..... 23

Page

K

Kelker, DeLeuw & Co..... 23
Kelly, Cooke & Co..... 23
Kuhlman Car Co..... 69

L

Le Carbone Co..... 57
Lecce-Neville Co..... 30
Lorain Steel Co., The..... 61

M

Mack Trucks, Inc.....14-15
McCardell Co., J. R..... 54
McClellan & Junkersfeld 22
Metal & Thermit Corp..... 41
Mica Insulator Co..... 56
Miller Trolley Shoe Co..... 46
More-Jones Brass & Metal Co.. 59
Morganite Brush Co..... 57
Morton Mfg. Co..... 23

N

Nachod and United States Signal Co., Inc..... 54
National Brake Co., Inc..... 21
National Pneumatic Co..... 13
National Railway Appliance Co. 61
Naugle Pole & Tie Co..... 67
Nichols-Lintern Co., The..... 25
Norma-Hoffman Bearing Corp.. 55
Nuttall Co., R. D..... 53

O

Ohio Brass Co..... 5
Okonite-Callender Cable Co., Inc. The 60
Okonite Co., The 60

P

Pantasote Co., Inc., The..... 59
Perey Mfg. Co., Inc..... 67
Positions Wanted and Vacant.. 63

R

Rail Joint Co., The 61
Railway Trackwork Co..... 4
Railway Utility Co..... 67

Page

Ramapo-Ajax Corp..... 67
Richey, Albert S..... 22
Roebling's Sons Co., John A... 67
Rome Wire Co.....Insert 11-12
Rooke Automatic Register Co.. 62
Russell, Burdsall & Ward Bolt & Nut Co. 44

S

Sachsenmaier Co., Geo..... 63
Safety Car Devices Co..... 8
Samson Cordage Works..... 67
Sanderson & Porter..... 22
Searchlight Section 63
Silver Lake Co..... 60
Six Wheel Co., The..... 33
Smith Heater Co., Peter..... 67
Standard Oil Company..... 46
Standard Steel Works Co..... 39
Star Brass Works 62
Stevens & Wood, Inc..... 22
Stone & Webster, Inc..... 22
Stucki Co., A..... 23
Sullivan Machinery Co..... 55

T

Texas Company 38
Thornton Trolley Wheel Co.... 62
Timken-Detroit Axle Co., The... 31
Tool Steel Gear and Pinion Co., The 42

U

Una Welding & Bonding Co.... 23
United States Graphite Co., The. 53
United States Rubber Co..... 19
Universal Lubricating Co..... 66

W

"Want" Ads..... 63
Wason Mfg. Co..... 69
Westinghouse Electric & Mfg. Co. 2
Westinghouse Traction Brake Co. 9
Wharton, Jr., & Co., Wm..... 61
"What and Where to Buy", 64, 66, 68
White Engineering Corp., J. G.. 22
Wish Service, The P. Edw..... 23
Wood Co., Chas. N..... 67

WHAT AND WHERE TO BUY—Continued from page 66

Telephones and Parts
Electric Service Sup. Co.

Testing Instruments (See Instruments, Electrical Measuring, Testing, etc.)

Thermostats
Consolidated Car Heating Co.
Gold Car Heating & Lighting Co.
Railway Utility Co.
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Ticket Choppers & Destroyers
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Tickets and Transfers
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Ties, Wood Cross (See Poles, Ties, Posts, etc.)

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Transfer (See Tickets)

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Trolley Material (Overhead)
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Miller Trolley Shoe Co.

Trolley & Trolley Systems
Ford Chain Block Co.

Trolley Wheel Bushings
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Trolley Wheels (See Wheels, Trolley)

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Vestibule Linings
Haskelite Mfg Corp.

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Lorain Steel Co., The
Metal & Thermit Corp.
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American Steel & Wire Co.
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Welding Wire and Rods
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Wheel Guards (See Fenders and Wheel Guards)

Wheel Presses (See Machine Tools)

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11-79

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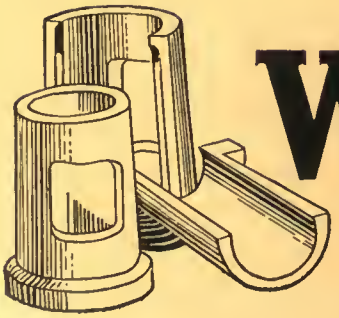
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Vol. 67
No. 26

CONTENTS

Pages
1083-1132

JUNE 26, 1926

Editorials 1083

New Light-Weight Equipment Pays! 1086

A.E.R.A. committee on essential features of modern cars submits designs for city and interurban cars. Elimination of needless variations in design urged. Results with new cars on a number of properties show big return on the investment.

Public Safety Demonstrated in El Paso 1098

Houston's Talking Cars Remodeled from Old Equipment 1098

By F. J. BENNETT.

Many innovations introduced to attract the attention of the car rider. Air-operated electric signs used effectively.

Washing the Brooklyn Tunnels 1099

Tri-City Trainmen Sign After Reading Bulletins 1100

Railway Aids Safety Drive at Joliet 1100

One Owner's Faith in the Trolley—I 1101

After others lost hope, C. A. Smith made "Stream Line" interurban successful. Straighter track, higher speed, greater safety and more attractive cars have helped bring about the improvement.

Improved Training for Platform Men Used on Third Avenue System 1105

By DR. CHRISTIAN P. SEGARD.

Emphasis is laid on methods of instruction as against selective work. Formation of correct habits used as the foundation of the training school effort. Apparatus in the schoolroom is of simple but effective character.

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By J. A. ROWE.

Improvement Made in Rolling Stock of British Tramways 1109

More than 550 new cars included in recent orders. Much reconstruction has been done to promote passenger comfort. Modernization of motors has resulted in greater speed.

The Readers' Forum 1113

A Good Selling Job on a Single Page Circular 1113

Maintenance Notes 1114

American Association News 1117

News of the Industry 1118

Recent Bus Developments 1124

Financial and Corporate 1125

Personal Mention 1128

Manufactures and the Markets 1129

Facts First—

The Duty of the JOURNAL

NOT long ago a railway manager remarked that the publication of deficits was not an encouraging note to sound in the pages of the leading magazine of the industry. While this is true it has nevertheless been this very policy of publishing facts, good or bad, that has made possible such leadership.

Success of the JOURNAL depends as much on the success of the industry as any other affiliated agency, and a deficit is no more glad tidings to its staff than to the railway board of directors to which such a report may be addressed. To hide the results or camouflage the facts would be not only bad publishing, but as futile as the habit of the ostrich, which hides his head in the sand to avoid his enemies.

The JOURNAL has faith in the industry and faith in the ability of its personnel to build bigger and better the structures of its art. The deficits of today, like the mistakes of yesterday, will be but landmarks to guide the progress of tomorrow. The truth is essential and cannot be avoided.

McGRAW-HILL PUBLISHING COMPANY, INC.

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C.E.R.A.—Ahoy!

Aboard the "South American",
On Erie, Huron, Michigan,
Good railway men can learn a lot
About more riders—how they're got.

A glassy sea fine riding makes,
But bumping wave no pleasure wakes.
Exactly so with cars on rail—
The best of cars on rough track fail.

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1199

SAVING THE RAIL SAVES THE RAILWAY



How do you Measure Ear Service?

Here is Shown What One Road Gained by Using Marathon Ears

1. Life of Ears: 24 months for Marathons vs 6 to 8 months for others.
2. Savings in Dollars: Estimated at $5,000 a year since using Marathon Ears.
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These figures were furnished by the Electrical Engineer of a large city property and are actual performance records. Facts such as these show that O-B Marathon Ears do insure substantial, worth-while savings. And they give you a new standard by which to measure trolley ear service.

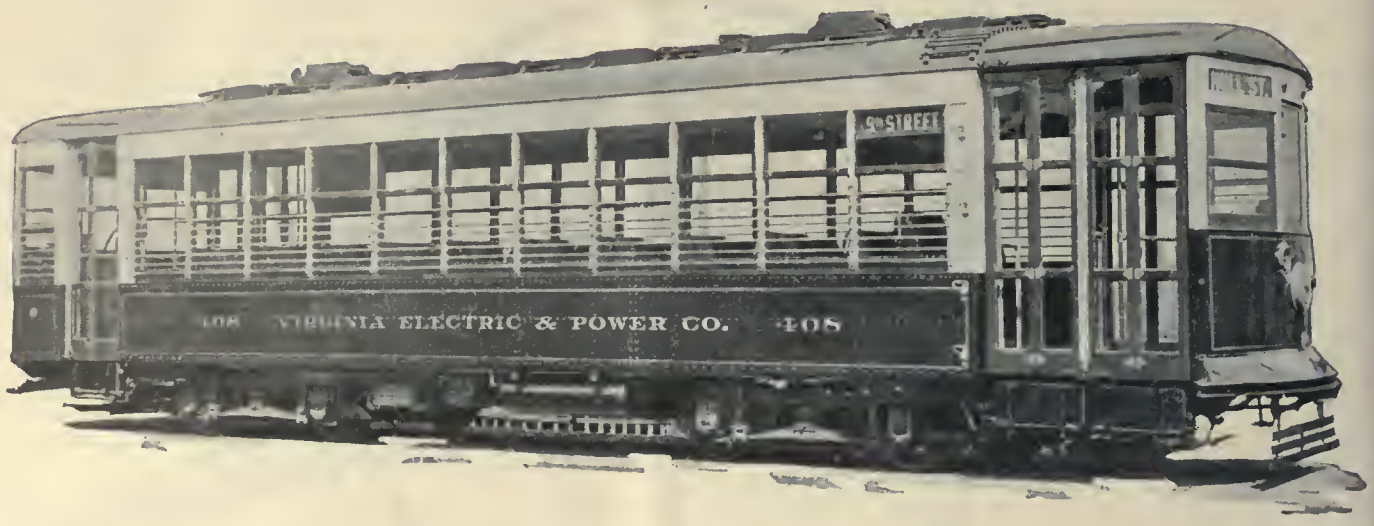
This is but similar to the records of these modern ears on many properties. All of them show substantial economies. It will pay you to specify Marathons on your next order.

Ohio Brass Company, Mansfield, O.
Dominion Insulator & Mfg. Co., Limited
Niagara Falls, Canada

80B

Ohio Brass Co.

PORCELAIN INSULATORS · LINE MATERIALS · RAIL BONDS · CAR EQUIPMENT · MINING MATERIALS · VALVES



A new user of Variable Load Brakes

The *Virginia Railway and Power Company* has recently put into service 15 new cars equipped with Westinghouse Variable Load Brakes.

This is one of the many traction companies that have recognized the auspicious part that Variable Load Brakes can play in the operation of modern light weight surface cars.

Variable Load Brakes provide for the same effectiveness of retardation throughout the entire range of car loading, thus assuring uniformly short stops which are reflected in greater safety and increased schedule speeds.

Information regarding Westinghouse Variable Load Brakes may be obtained upon application to our nearest district office—*Ask for Descriptive Catalogue T-2045.*

WESTINGHOUSE TRACTION BRAKE CO.
General Office and Works: WILMERDING, PA.

WESTINGHOUSE TRACTION BRAKES

Check steel tie construction with these essentials of good paved track—



BEARING—The efficient design of Steel Twin Ties provides 156 square inches of effective bearing per track-foot at the lowest cost per unit of bearing — and, where it is most needed, 468 sq. in. of bearing under each joint.

PERMANENT MATERIALS—In Steel Twin Tie construction, the tie structure embedded in concrete is not affected by water, temperature variations or rot.

ECONOMY—Steel Tie Track minimizes excavation, concrete and track labor. It costs no more than wood ties in rock ballast and its longer life decreases the cost per track-foot per year.

For estimating get the 1926 prices at your delivery point.

The International Steel Tie Company
Cleveland, Ohio

Steel Twin Tie Track

Renewable Track—Permanent Foundation



Metal or Mileage

IN this "multiple wear wheel" you get a lot of metal for your money. But it's mileage, not metal, you're after.

This un-treated tread soon wears. The wheel is removed, sent to the shop for re-turning, comes back, is reapplied and the shimms adjusted for correct platform height.

But it quickly wears again and the maintenance story is repeated.

Finally after another interval of service it is discarded.

IN this Davis "One-Wear" Wheel, you get the mileage with less weight and without the maintenance.

Made from special steel and heat-treated, the Davis "One-Wear" Steel Wheel is fundamentally strong.

Heat treatment secures the utmost wear that the special high manganese steel can develop.

The Davis "One-Wear" Steel Wheel keeps running while other wheels are in the shop for turning. Buy Davis Steel Wheels for greater serviceability of equipment.

AMERICAN STEEL FOUNDRIES

NEW YORK CHICAGO ST. LOUIS



A familiar scene in many of the larger cities, where attractive buses with Bender-built bodies and Hunter Signs are popular!

Unquestionably a public conveyance!

That's the business touch which Hunter Signs give to the motor bus

By day or night Hunter Signs "Tell the Public where you're going." Reliable bus companies operating on fixed routes and schedules sell the public their transportation service by means of Hunter Signs. They are made in types for every service.

ELECTRIC SERVICE SUPPLIES CO.

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DETROIT
General Motors Building

Lyman Tube & Supply Co., Ltd., Montreal, Toronto, Vancouver

The Phono Record

1865 A bulletin of Phono-Electric Achievement 1926

Atlanta becomes a Phono City

Modern overhead and modern cars help build street railway prosperity

Where Sherman Marched Car Bell Now Clangs

Eighty-two years ago Atlanta had not been thought of. Today she ranks sixth city of the United States,— the booming industrial headquarters of the South.

The car bell, sign of prosperity and progress, now clangs merrily where Sherman's soldiers once trod. And Phono-Electric Trolley Wire, sign of progressive thinking in overhead construction, now totals 20 miles in and around the city.

Thus Phono-Electric in service again proves claims made on a basis of its performance in practically every city of importance in the United States. It outwears ordinary hard drawn copper two to three times. It reduces wire breakage. It possesses fatigue resistance and high tensile strength of particular value to operators of city systems such as that in Atlanta, where sharp curves, short headways and heavy traffic are rules of the day.



"Bridgeport" BRASS TRADE MARK CO. Phono-Electric

Rapidly becoming standard in Atlanta

Strength, toughness and ductility at such places are good qualities on which to build.



Rejected—becomes dominant city

Old Story of Stone Rejected by Builders Becoming Corner Stone of South

When the Georgia Railroad wanted to build its terminus in Decatur, Georgia, the inhabitants refused permission, so the line was extended 6 miles, and a new village established. At the time this village was called, appropriately, Terminus. Now it is called Atlanta, sixth city of the country,— *and Decatur is one of its suburbs.*

The moral being that it pays to keep well abreast of developments, and to take good care that prejudice never becomes a handicap whether you buy real estate or trolley wire. Have you had your copy of the Phono-Electric Book? Better let us send you one right now, it is full of interesting facts.

MEMBER AERA

Bridgeport Brass Company
BRIDGEPORT - CONNECTICUT



213,492 COACH MILES *and* ONLY *ONE* STOP *for* MECHANICAL TROUBLE

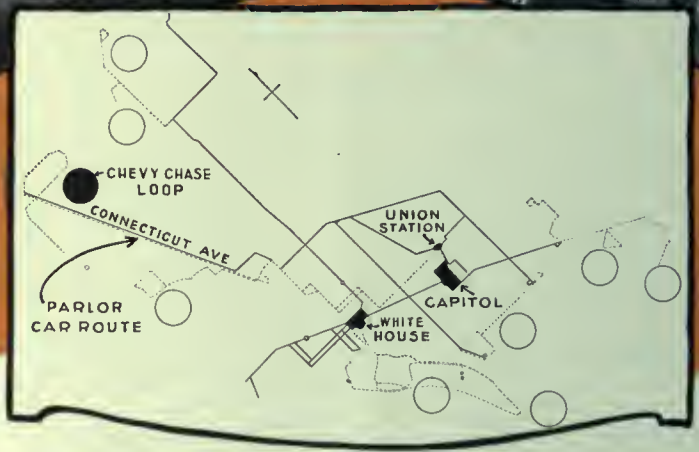
YELLOW KNIGHT

that's PERFORMANCE

the exclusive CHEVY CHASE RUN uses YELLOW PARLOR COACHES -exclusively









HE Capital Traction Company at Washington D. C., operate eight Yellow Parlor Coaches over the exclusive Chevy Chase Coach Line.

Only *once* in 213,492 miles has a Yellow Coach been out of service for mechanical trouble—and then only for a few hours.

Moreover, during 1925 when covering a total of 98,000 miles there were only nine delays on the road from trouble of *any sort*, including tires. Only 282 minutes lost from all causes.

That's performance!!

The service was inaugurated on September 15, 1925, to operate on a route eight miles long, connecting the exclusive Chevy Chase suburb with the downtown section, including the Union Station and the Capitol.

The fare was fixed at 25 cents with a policy of giving the finest possible class of service with a seat for every person, no standees even during peak hours.

From the beginning the operation was a success. Within eleven weeks the company was making money, and profits have been steadily climbing up ever since.

Eight Yellow Parlor Coaches are now averaging 130 miles a day, and each is constantly contributing to the

success of the operation, as is proven by the accompanying operating cost figures, in cents per mile.

Everybody rides on the Chevy Chase Coach Line from Senators to children, and the service duplicates that given by the Company's own street cars at something more than three times the fare. No apparent reduction has been noted on the car lines, in fact the tendency for street car riding shows an increase, due to general local trend. The traffic attracted by this de luxe service is new business, or business which the Capital Traction Company had years ago and which slipped away during the rapid growth of the private automobile.

Yellow Coach *plus* General Motors are at *your* service to help you build up profitable operations.

	Cents per Mile
MAINTENANCE	
Buildings	0.30
Bus Bodies	0.39
Bus Chassis	1.12
Tires and Tubes	1.75
Shops and Garage Equipment	0.01
Service cars — maintenance and operation	0.06
Depreciation	5.13
TOTAL	8.76
GARAGE OPERATION	
Garage Employees	1.41
Garage Supplies and Expenses	0.66
TOTAL	2.07
TRANSPORTATION	
Chauffeurs' Wages	5.66
Gasoline	3.38
Lubricants	0.22
Other transportation expenses	0.47
TOTAL	9.73
TRAFFIC PROMOTION	
Advertising	0.04
GENERAL AND MISCELLANEOUS	
Officers' Salaries	0.32
Injuries and Damages	0.11
Insurance	0.01
Rent of Equipment	0.16
Miscellaneous and General	0.05
TOTAL	0.65
Taxes	1.00
Operating Expenses and Taxes	22.25

YELLOW KNIGHT

YELLOW TRUCK & COACH MANUFACTURING CO.
SUBSIDIARY GENERAL MOTORS CORPORATION
5801 WEST DICKENS AVENUE, CHICAGO, ILL.



SOLDIERS AND SAILORS MONUMENT, CLEVELAND, OHIO

NP

RECOGNITION

This monument commemorates a service rendered. It is a token that the public is both quick and certain to appreciate all contributions to its safety, comfort and protection.

In a more humble capacity, National Pneumatic Door and Step Controlling Mechanisms have also contributed to public safety. On the cars of Cleveland and in many other cities, therefore, these devices play no small part in the maintenance of favorable public relations and increasing the number who faithfully contribute to the street car fare box.

NATIONAL PNEUMATIC COMPANY

Executive Office: 50 Church Street, New York
General Works: Rahway, New Jersey

MANUFACTURED IN

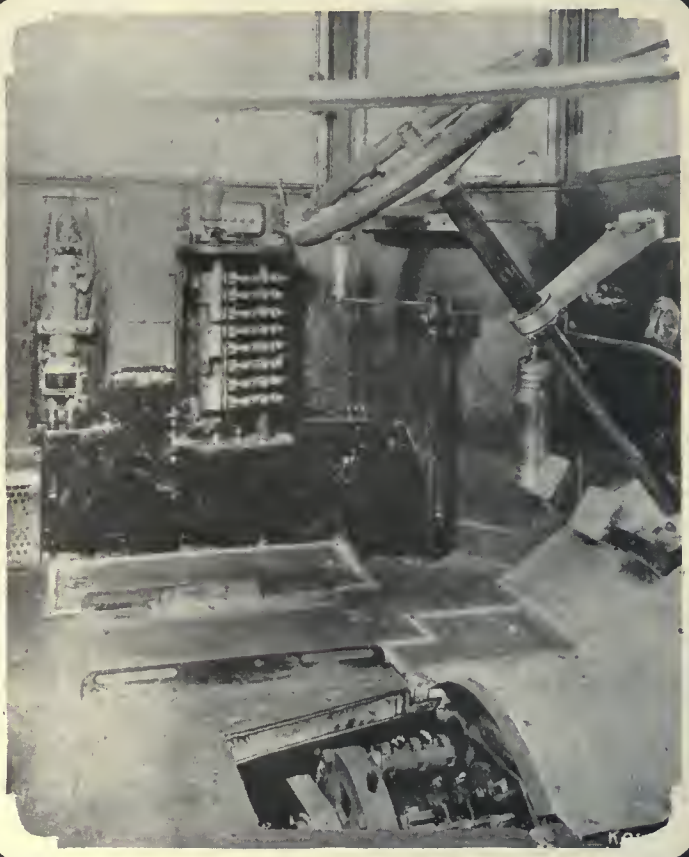
CHICAGO
518 McCormick Building

TORONTO, CANADA, BY
Railway & Power Engineering Corp., Ltd.

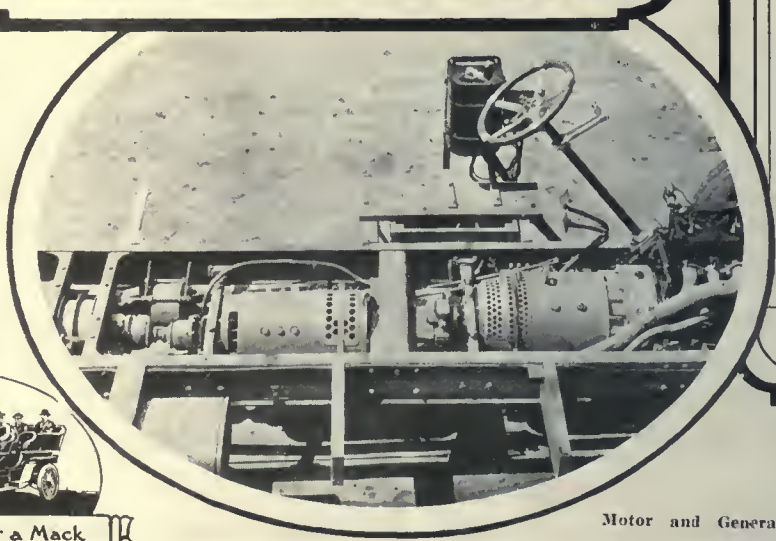
PHILADELPHIA
1010 Colonial Trust Building

Reg. U. S

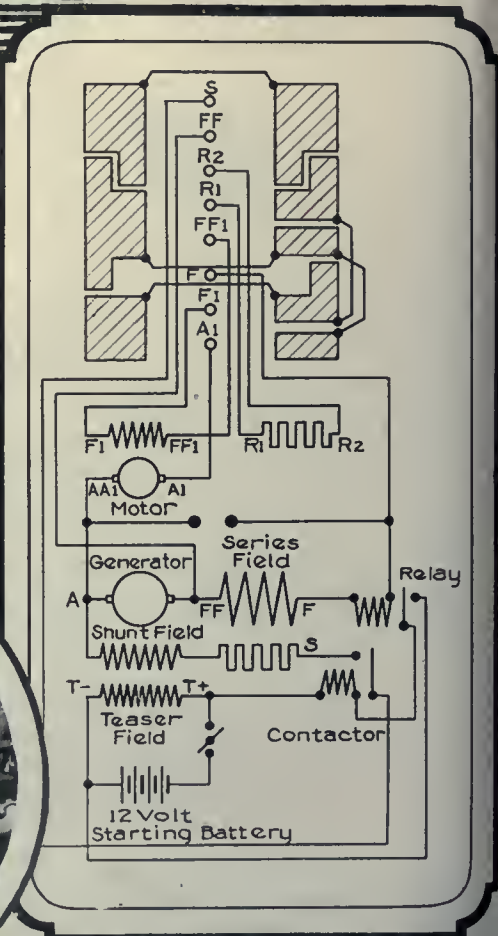
GAS-EL



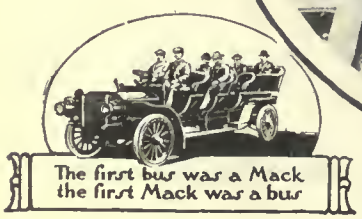
Control Units



Motor and Generator Installation.



Wir'ng Diagram



Pat. Off.

GAS-ELECTRIC —one-motor drive

Economy points to one motor

Only one electric motor is used in the Mack Gas-Electric One-Motor Bus.

Mack engineers *might* have adopted the usual two motor drive, but one motor does the job where two motors mean more weight, more care and higher maintenance costs.

Economy for the operator, and the value of retaining the standard Mack rear axle and single propeller shaft, pointed to one motor drive as the logical design behind which Mack could stand 100 per cent. Motor is high speed type, driving through dual reduction gears and differential to the rear wheels. Road clearance is the same as in the standard Mack gear driven bus.

Again Mack wins by employing a Rubber Torsion Insulator to take up the inertia of the generator and armature. Only Mack uses this feature, developed after long experience with Rubber Shock Insulators. Self-excited generator and the one motor are both mounted in rubber.

Mack engineering skill also provides complete accessibility to all electrical units for inspection and repairs. They can be reached through conveniently situated trap doors in the floor or they can be removed from below without interfering with adjacent assemblies.

If you are looking for more service hours on the road, faster schedules, ease of maintenance and more profitable operation, investigate the Mack Gas-Electric One-Motor Bus through the Mack direct factory branch nearest to you.

MACK TRUCKS, INC.
INTERNATIONAL MOTOR COMPANY
25 Broadway, New York City

One hundred and seven direct MACK factory branches operate under the titles of: "MACK MOTOR TRUCK COMPANY," "MACK-INTERNATIONAL MOTOR TRUCK CORPORATION," or "MACK TRUCKS OF CANADA, Ltd."



The Mack Bus

Each of Your Salesmen Should Have the 1926 Edition

Electric Railway Directory

Because:—

All purchases are passed upon by two and often three officials before the order is placed. If your salesmen are not procuring orders they are not interviewing the proper officials.

With 65% changes in this directory over 1925, it is very important your salesmen are directed right to save time and possibly embarrassment.

$296,000,000 will be spent this year for new equipment, material and supplies—Can your salesmen afford to make one false step on his introduction?

The above holds true respecting your mailing lists. With six changes for each property listed makes your old mailing list practically worthless.

It is too expensive to have your literature go wrong. In fact the directory pays for itself many times over the first campaign.

Price $7.50 for one copy—

10% off for five or more.

Leading Features

1—Complete list of every recorded electric railway company in the United States, Canada, Mexico, and the West Indies.

2—List and addresses of officials, superintendents, department heads and purchasing agents, corrected to date of issue.

3—Addresses of companies operating buses.

4—Addresses of bus repair shops.

5—Mileage of track and bus routes.

6—Number and kinds of cars used.

7—Rates of fare.

8—Amusement parks owned or reached.

Directory Department, Electric Railway Journal, 10th Avenue and 36th St., New York, N. Y.

Gentlemen:—Will you please send me:

.....copies of 1926 McGraw Electric Railway Directory, check for $..... enclosed.

.....More complete information concerning contents.

Name .....

Company .....

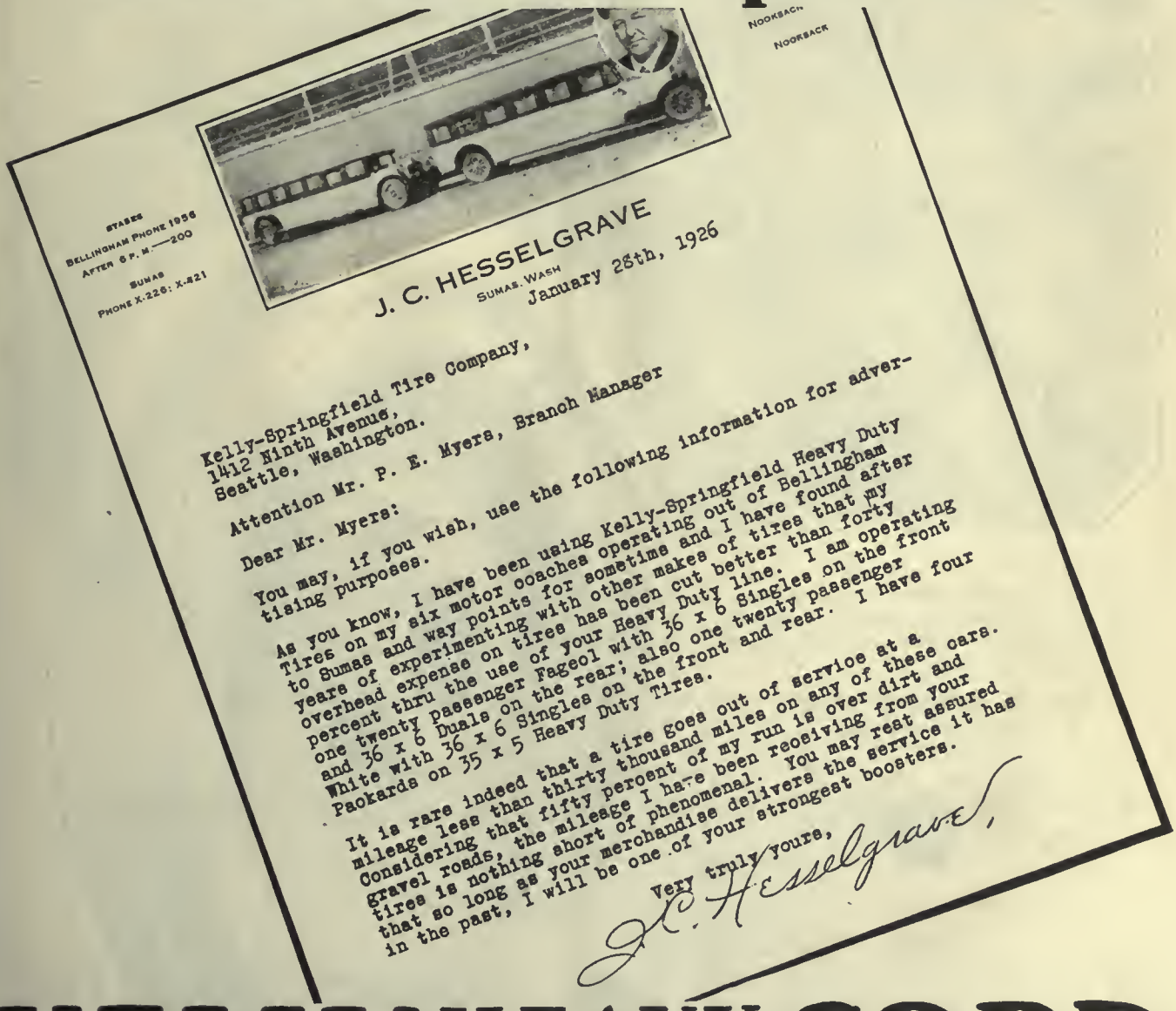
Street .....

City .....State .....

E.R.J. 6-26-26



Kellys cut his overhead better than 40 percent



STAGES
BELLINGHAM PHONE 1956
AFTER 6 P. M.—200
SUMAS
PHONE X-226; X-821

NOOKSACK
NOOKSACK

J. C. HESSELGRAVE
SUMAS, WASH

January 28th, 1926

Kelly-Springfield Tire Company,
1412 Ninth Avenue,
Seattle, Washington.

Attention Mr. P. E. Myers, Branch Manager

Dear Mr. Myers:

You may, if you wish, use the following information for advertising purposes.

As you know, I have been using Kelly-Springfield Heavy Duty Tires on my six motor coaches operating out of Bellingham to Sumas and way points for sometime and I have found after years of experimenting with other makes of tires that my overhead expense on tires has been cut better than forty percent thru the use of your Heavy Duty line. I am operating one twenty passenger Fageol with 36 x 6 Singles on the front and 36 x 6 Duals on the rear; also one twenty passenger White with 36 x 6 Singles on the front and rear. I have four Packards on 35 x 5 Heavy Duty Tires.

It is rare indeed that a tire goes out of service at a mileage less than thirty thousand miles on any of these cars. Considering that fifty percent of my run is over dirt and gravel roads, the mileage I have been receiving from your tires is nothing short of phenomenal. You may rest assured that so long as your merchandise delivers the service it has in the past, I will be one of your strongest boosters.

Very truly youre,

J. C. Hesselgrave.

KELLY HEAVY DUTY CORD

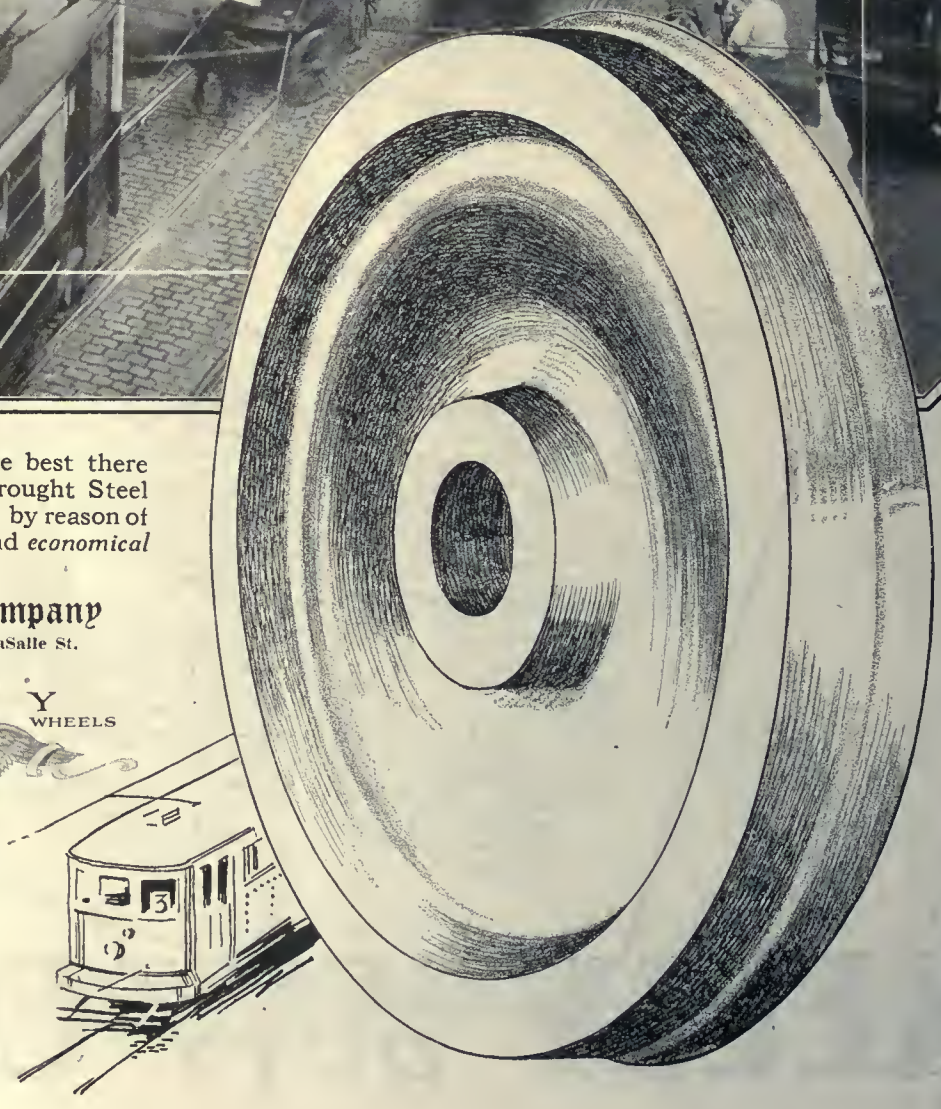


Modern traffic demands the best there is in equipment. Gary Wrought Steel Wheels meet these demands by reason of their *safety, dependability* and *economical mileage cost.*

Illinois Steel Company

General Offices, 208 South LaSalle St.
Chicago, Illinois

G A R Y
WROUGHT STEEL WHEELS





The Modern Car *is a business builder*

WHAT could be more effective in drawing increased patronage to the electric railway than the modern car? Its convenience has never been equalled. Now it is more pleasing in appearance, more comfortable to ride in, and quieter than ever before.

With all the modern features the street car is becoming the preferred method of transportation.

Among recent orders received by this company is one for 34 cars of the type illustrated, for the Chicago Surface Lines.

Cummings Car and Coach Company

Successor to McGuire-Cummings Mfg. Co.

111 W. Monroe St., Chicago, Ill.

Light Weight City and Interurban Cars — Single and Double Trucks

Cummings Gas-Electric Motor Coach



Rapid Acceleration
– a test and proof of Gearing

Near the top of the list of high-schedule-speed systems is the Chicago Surface Lines, maintaining this position in spite of traffic congestion that is equalled in few cities.

Tough, indeed, must be the gears which will stand such gruelling, rapid-acceleration service as Chicago's—and the Chicago Surface Lines selected grade M Gears and Pinions for more than half its requirements of the past year, and for its total 1926 requirements.

Bear this fact in mind in connection with your modern-cars-for-better-service program in which rapid acceleration is so vital a factor.

G-E Railway Gearing is favored by research facilities that are unsurpassed, and nothing is omitted from the processes of its manufacture and test that will help insure the highest-quality product that it is possible to produce.



For
Modern Equipment Standards

54C-32

GENERAL ELECTRIC

Electric Railway Journal

Consolidation of Street Railway Journal and Electric Railway Review

Published by McGraw-Hill Publishing Company, Inc.

CHARLES GORDON, *Editor*

Volume 67 New York, Saturday, June 26, 1926 *Number* 26

Now that the Car Engineers Have Reported, What Will the Industry Do?

FOLLOWING an exhaustive study of the electric railway car situation the engineers forming the committee on essential features of modern cars have presented their report. A comprehensive digest is published in this issue. The time of these three engineers was donated to the industry by the respective manufacturing companies which they represent. They were appointed to their task after a series of meetings of interested manufacturers and railway executives, for the purpose of stimulating development of the electric car. The plan received the formal approval of the American Electric Railway Association executive committee and the engineers have worked under the chairmanship of G. C. Hecker, special engineer of the association, in close contact with Managing Director Storrs.

In its study the committee sought advice and counsel wherever it was available. It co-operated closely with the committee on unification of car design and its findings reflect the operators' views as well as those of the manufacturers. The report has been accepted by a group of manufacturer executives acting under the chairmanship of Mr. Storrs. Present plans contemplate printing the report in full and distributing it to all operating companies and interested manufacturers.

What will be the result? Will this constructive piece of work take its place along with countless other recommendations of association committees which gather dust while operating officials blithely continue to gratify their personal whims in demanding special requirements that add heavy cost to electric railway equipment? Or will it bring about realization of the necessity for creating a market for cars of the types recommended so that car building can be put on a manufacturing basis with a consequent saving in cost of cars? Will those responsible for the executive control of operating properties accept this as a "fine report" and then forget it, or will they hold conferences of their operating and mechanical officials and demand to know why its recommendations should not be followed? If they disagree with the recommendations will they throw the report aside and continue to point to the high cost of new cars as the reason for continuing to operate the 25,000 obsolete cars that give electric railways a "down at the heels" aspect in the minds of the public, or will they understand and appreciate its intent and spirit to the extent of writing out their objections and forwarding them to the association?

But the report will also go to manufacturers—car builders, equipment manufacturers and others. What will they do? Will they grasp the opportunity thus afforded to put car building on a manufacturing instead of a contracting basis? Are they prepared to accept the responsibility of assuming the initiative in improving the electric car? Are they ready to come before the industry with cars that reflect their individual enterprise provided a market is reasonably assured?

Is the electric railway industry ready to accept the challenge of the automobile? Has it the necessary faith in the possibilities of the electric car? Has it the ingenuity and courage necessary so to improve the character and attractiveness of common carrier vehicles as to win back many of those who are becoming tired of the expense and the traffic difficulty experienced in providing individual transportation? Are both manufacturers and operators alert to the opportunity for getting together for the good of the industry as pointed out in the report?

The work of the committee will have been in vain unless its report results in action. It does not contemplate a standard car. It does not limit progress and development by the manufacturers. It merely attempts to bring about some agreement as to the general types, sizes and weights of cars suitable to average city and interurban conditions. The report affords a basis for agreement between operators and manufacturers as to the general features of design, which would assure the latter a market to justify them in taking the initiative in development.

NOW is a critical period for the electric car in street and interurban service. The action—or the lack of it—following this report will determine whether operators and manufacturers have the vision and courage to grasp the present opportunity. The committee suggests a questionnaire to determine how many operating companies would adhere to its recommendations in buying cars. That would help in determining the extent of the market available. But there is another way of bringing about constructive action. The mechanism is already set up in the Advisory Council. Its membership includes men who wield a strong influence over the buying policies of many properties. It has there the power to create a market for cars manufactured according to the committee's recommendations. It is also in a position to ask pointed questions of manufacturers who fail to carry out the spirit of the report. With a start of that kind competition and merchandising effort will assure progress.

The action of the industry at this time is the turning point for the street car. Either it will assume its proper place as an up-to-date common carrier vehicle or it will be crowded off the streets of many American cities due to the timidity, lack of vision or obstinacy of those interested in its operation and manufacture. These are strong words, but the occasion demands them.

What will the industry do?

Prospects Appear Good for a New Deal in Tacoma

SOME time ago mention was made in ELECTRIC RAILWAY JOURNAL of the handicap under which the Tacoma Railway & Power Company had operated its railway lines during the periods of incumbency of Mayor Fawcett. That anachronism of American politics continued to play the single catgut in discord until the people of Tacoma turned him out of office. Meanwhile distressing damage had been done to the railway, but not damage that was irreparable. Things appear to be much better now in Tacoma. There is a new Mayor in the saddle and with him sits a new Council. Under this new Mayor, Melvin G. Tennent, conferences have been started with the end in view of restoring relations between the city and the company to a basis that should prove profitable to both.

Things have not yet gone very far in Tacoma under the new régime, but the negotiations have been opened under conditions that are auspicious. The fact seems now to be realized that the railway is no less worthy of its hire than is the individual and as a basis for fixing that hire a valuation is to be agreed upon and the company is to be permitted to earn at least 6 per cent on the valuation so reached, with fares, of course, on a basis that will permit that return to be earned. As one of the first indications of its willingness to help toward a settlement, the city has refused to renew operating permits to the Puget Sound Transportation Company, until recently a competitor of the railway. That in itself is very important. Moreover, it is more than a gesture, for the new Mayor appears to be fully cognizant of the harm that has been done in the past by just such so-called competition.

As for the railway, Manager Sullivan expressed a hope that the city might find a solution of its transportation problem so good and so advanced that it would set a pace for cities faced with similar problems. He declared that the system must be ready to give the city 24-hour service 365 days a year, but said that some of the problems of service are beyond human power to determine in advance of application and that a period of experimentation is essential. In this he is absolutely correct. The city needs not only to try to be fair to the company but to be patient with it as well. Of course it is too early to attempt to predict the possible outcome of the present negotiations, but the spirit evident in the first session may be regarded as auguring well for the railway and the city to reach some settlement of the problem.

Sane Transit Advice from Wall Street

UNCANNY understanding of the problems of the electric railways is shown in a recent editorial in the *Wall Street Journal*. It might be expected that that paper would be well informed on questions of finance connected with electric railway operation, but it did come somewhat as a surprise to see it manifest such knowledge as it did of the city transportation problem as a whole in its recent discussion of the proposal of former Comptroller Craig to sell certain surface lines to the city. Its discussion was of a subject of prime interest to New York, but the observations are equally applicable in most any community. On this account the comment is of general interest. One may or may not agree with its strictures regarding terms of the proposed sale of certain surface lines to the city, but surely that paper is on sane ground when it suggests as it did an engineering study on the public's behalf "of the advantages of buses compared, not with antiquated surface cars now feebly operated but with modern electric cars adequately maintained and competently run."

But New York City has done many stupid things transit-wise in the past. It would appear that it is likely to do them again despite all the warnings. If it had not in the past done some stupid things, the roads in the city now sore beset would not be in their present plight. True, there may have been traction manipulations in the past, but the local roads have more than atoned for any sins of earlier days. The onus for their present condition is not altogether theirs. It is largely the city's. In short, it is one thing to make a mistake. It is another thing to keep on repeating that mistake. The unfortunate thing is that New York City keeps repeating its transit mistakes. It keeps on repeating its mistake because for a long time past the railways have been made a political football. Why should there be any display on the part of the city of a willingness to entertain proposals for bus operation based on acceptance of a 10-cent fare while the avowed attitude is to deny a similar rate to the railways? Not until there arises in public office a man big enough to put the best interest of the city above the matter of his own political aggrandizement will the issue be settled.

The situation in New York is too complicated to say just what will come out of it, but it will indeed be most unfortunate if anything importunate is done before the railways have a chance to demonstrate what can be done with the roads worked as the *Wall Street Journal* would have them operated. It would seem that there are examples enough throughout the country for New York to study to prove that the *Wall Street Journal* is right. Yes, New York may be in need of buses. But more than that does it need modern electric cars adequately maintained and competently run. And that means a policy consistently as fair toward one mode of transportation as it is to another. Is that beyond hope? If surface indications mean anything it appears to be. That is why the transportation policy of New York is a poor guide for the rest of the country.

Flexibility of the Bus in Theory and in Practice

IT IS the amateur student of traffic problems in particular against whom the *Wall Street Journal* and trained transportation men issue their words of warning. From time to time these amateurs bob up with the proposal that buses be substituted for street cars in order "to relieve congestion." The basis for such suggestions appears to be the idea that the bus is more flexible in operation than the street car. While this may be true in theory, the extent of its realization in actual practice is somewhat problematical. Moreover, flexibility itself really is of small value as a means of reducing congestion.

In theory it is possible for the bus to alter its course to pass around temporary obstructions, something which the street car cannot do, but it usually happens where traffic is dense that the bus is so closely wedged in among other vehicles that its freedom of motion is largely lost. Consequently it is subject to just about

the same minor delays as the street car. Cross traffic at intersections has the same detrimental effect on its operation as on car operation.

Nor is there much to choose between a bus and a street car so far as the influence on the movement of other vehicles is concerned. The car stops on its tracks halting other vehicles behind it and immediately alongside it. The bus weaves in and out of the traffic to reach the curb to pick up and discharge its passengers, thereby interfering seriously with other vehicular movements. Careful study of traffic has shown conclusively that weaving in and out tends to produce congestion. Without some definite advantage one way or the other comparison of carrying capacity or effect on congestion of bus and car in the same character of service get nowhere.

The layman is prone to expect the bus to be successful in replacing the street car everywhere because in the past it has been successful in doing it on certain routes. Then, too, the thing which we lack always looks more attractive than the thing which we have. The interference to other traffic caused by street cars is a known quantity—that which would be caused by buses is only a vague possibility until the change is made. A change such as this should be made only after due investigation and deliberation, therefore, lest the last state of congestion be worse than the first.

The Railway Now Dons the Rôle of the Good Samaritan

IT IS indeed a dull week when the citizens of Philadelphia are not greeted with some service innovation on the part of the Philadelphia Rapid Transit Company. The most recent of these deals with the manner in which the company has undertaken to succor the hereditary foe of public transportation, the private automobile. Having taken over the local Yellow Cab Company some weeks ago the problem of caring for disabled taxis sprang into being. Realizing that it would be necessary to keep towing facilities on hand for this purpose it occurred to company officials that the towing trucks might well be made available for public use, thus providing an added duty for this equipment tending to greater economy. The manner in which a number of old cabs were remodeled for this service was recounted in the issue of ELECTRIC RAILWAY JOURNAL for June 12.

To adopt an attitude of studied indifference toward a source of profitable revenue such as this simply because it may prove to be a boon to the automobile owner ill befits the railway executive today. For this the railway has been able to reduce overhead in this particular department and has made a definite bid for improved good will by showing itself ready to cooperate with the public in every form of transportation, even though of a competitive nature. Towing service with fixed meter charges will quickly drive the pirate off the streets. At the same time no vast bulk of present car riders will desert the public transportation facilities for private automobiles simply on the strength of this new service.

The present towing service makes no bid for patronage from truck or bus, due to the excessive weight of the latter. But it would seem that the same plan might be expanded by railways operating large bus fleets, to embrace the heavier vehicles which have failed at the roadside. Even the best of buses break down now and then. Emergency equipment must be kept on hand for these exigencies that in many cases might be profitably placed at the call of the truck operator who is operating far from his own base and is without emergency equipment. For the automobile owner, at least, the idea of a standardized towing charge has much to commend it and it is safe to predict that the Philadelphia company will soon be faced with the necessity of providing enough supplementary equipment to cope with the growing demand.

As Others See Us

MOST electric railway men are agreed that the automobile has introduced new conditions in the transportation market which have completely upset old standards and old methods. As the result of the widespread use of private vehicles, common carrier transportation found itself faced with serious competition. The need for merchandising effort soon became obvious, and the subject of attracting riders to street cars has occupied a large part of the industry's attention.

The automobile manufacturers have more than demonstrated their genius both as engineers and salesmen. They have literally put America on wheels. Although street car riding has suffered, their efforts have resulted in building up an enormous increase in the total riding habit.

Viewing this situation in a broad way, some transportation men have seen new opportunities for increasing common carrier business. There is a growing conviction that this can be accomplished by making street car riding more attractive. The automotive reaction to present railway activity is reflected in a recent editorial in *Automotive Industries* under the heading "Selling the Street Car."

> With the constantly increasing popularity of the automobile and the motor bus making them more worried every year about future business, the electric railways in many cities are conducting active campaigns to sell the public on street car transportation.
>
> Positive, constructive sales effort on the part of the electric lines is not only natural, but entirely warranted under the circumstances. But when these efforts are tied up with an attempt to decrease the sale of automobiles they may fairly be criticised.
>
> Indianapolis street cars, for example, are carrying a sign, prominently displayed, which reads: "Why buy the car when you can buy a ride at a time on the street car?" The automotive industry has never gone out to suggest that people stop riding street cars, however strongly it has merchandised the desirability of its own products. Positive selling almost always turns out to be more profitable than negative selling.
>
> A good example of the positive brand of selling as applied to street railway transportation is to be found in Grand Rapids, where the railways are now attempting to get what they consider to be their just share of the business by placing at the disposal of the public a new type of street car which is designed as far as possible along automotive lines. The cars are advertised as "electric railway coaches," are finished in striking colors, have a skirt around the bottom to give a low-hung appearance, are fitted with vibration-damped trucks and wheels and silent gears to reduce noise, and the seats are of the individual chair type, arranged in pairs, to further increase the comfort of the passengers.
>
> This is constructive merchandising. If the street railways expect to maintain their place in the transportation picture they must proceed along the line of improving the general character of their equipment.

New Light-Weight Equipment Pays

Lower Car Prices Are Possible

A.E.R.A. Committee on Essential Features of Modern Cars Submits Designs for City and Interurban Service—Elimination of Needless Variations in Dimensions Urged—Results with New Cars on a Number of Properties Show Big Return on the Investment

MANUFACTURING economies in the production of electric railway cars, with reflection in lower prices and reduced maintenance cost, are possible with reasonable unification of design. The great variety of designs in the past has prevented savings and any approach to quantity production. It is possible to eliminate the needless variations in dimensions, weight, and general arrangement of cars. Modern cars have been found to attract greater patronage and earn more revenue than those of obsolete design. These are the principal findings of the committee on essential features of modern cars of the American Electric Railway Association, which has been formed during the past year through the co-operation of the association and its manufacturer and operating members.

Following its studies, the committee submitted plans of a city car and an interurban car, showing how they may be adapted to meet conditions on practically any property without affecting the basic principles of the unification plan. Either car is planned so that it may be arranged for one-man, two-man, or one-man-two-man operation. Single-end or double-end operation is possible and the seating capacity may be adjusted to meet local conditions by designing the body with ten, eleven or twelve windows. Electric motors are standardized in three sizes, 25, 35 and 40 hp. The wheels recommended are of 26-in. diameter.

The drawings published herewith indicate that the dimensions included are general ones only. The proposed standardization will in no way limit manufacturers in developing a distinctive product. The cars may be equipped with any known specialties or safety devices. Ingenuity may be fully exercised in the design of structural details to reduce weight. Features which are intended to make the cars more attractive and add to the comfort and convenience of passengers are optional.

The second section of the report contains experience data on eight properties where modern light-weight cars have been installed. Operating and financial

Formation and Aims of the Committee on Essential Features of Modern Cars

DURING the annual convention of the American Electric Railway Association at Atlantic City last October a meeting of electric railway officials and manufacturers was held at the invitation of James H. McGraw to discuss the problem of replacing with modern equipment those cars which were built prior to developments in design tending toward attractiveness, comfort and light weight, as well as the inclusion of safety features. At this meeting it was decided to form a committee for the purpose of considering and reporting on ways and means of assisting electric railways in a general car replacement program. This committee worked out a plan which was approved by the executive committee of the American Electric Railway Association, and which was later presented to and approved at a meeting of manufacturers.

The principal features of the plan were: (1) Organization of an engineering committee representing car builders and equipment manufacturers, with the association's special engineer as chairman, to develop suitable car designs and to coordinate the efforts of the manufacturers in introducing uniformity in fundamental features. (2) Inauguration of a co-ordinated publicity and advertising effort on the part of the manufacturers to stimulate interest in the purchase of new cars. (3) Development of suitable arrangements for financing the purchase of cars through car trust certificates on terms which would make it possible to go forward with a general car replacement program. (4) Organization of an executive committee of manufacturers with Managing Director Lucius S. Storrs as director to supervise the activities of the engineering committee, and to carry out the other phases of the program.

The committee on essential features of modern cars was organized late in 1925 with the following membership: J. A. Brooks, chief engineer of the J. G. Brill Company, representing the car builders; C. A. Burleson, railway engineering department General Electric Company, representing electrical manufacturers; W. J. Clardy, engineering department Westinghouse Electric & Manufacturing Company, representing electrical manufacturers, and G. C. Hecker, special engineer American Electric Railway Association, chairman. This committee came to the conclusion that for the present, at least, its efforts should be directed toward the following important studies: (1) Selection of a series of modern cars, as few in number as possible considering the range of operating conditions to be encountered in both city and interurban service. (2) Presentation of data and information showing benefits derived on a number of properties as a result of introduction of modern rolling stock and modern methods of operation. (3) Analysis of the age of cars now in service.

The present report digested in this article consists of three parts, covering the topics outlined above.

statistics show the savings that have been effected and the return on the investment from the purchase of new equipment. The gross return ranges from 13 to 65 per cent on the cost of the new equipment that has been installed. Some of the properties also show a gratifying gain in gross revenue, indicating that attractive new cars are an important factor in stimulating traffic.

A feature of this section of the report is a bibliography of articles on the advantages of new cars which have appeared in ELECTRIC RAILWAY JOURNAL and other industry publications during the past two years.

In the third section of the report is a wealth of data concerning the purchase of cars since 1907, including a summarized statement, based on returns from 66 per cent of the industry, and the age of equipment in service by five-year periods.

CAUSES OF HIGH COST OF CARS

Modernization of electric railway equipment has been prevented due to the high cost of new cars, uncertainty as to the ultimate effect of motor vehicle competition, financial difficulties, and many other causes. Developments of the past few years have proved conclusively the essentiality and permanence of electric railway transportation. The industry is recovering slowly but surely.

In the opinion of the committee, "perhaps more progress would have been made in modernizing equipment had the manufacturers adopted a more aggressive policy in developing, manufacturing and selling a complete product." The car builders have "waited until the railway companies were in the market for new equipment, and then they called to submit their bids on the specifications and plans submitted by the operating companies. None of the intensive sales methods so prevalent in other lines of business was in evidence in the car-building industry. Today, however, a change is taking place. A more progressive spirit is abroad among the manufacturers. New types of cars are being developed; new ideas advanced, and more aggressive sales methods initiated, all of which should materially hasten the modernization program of the electric railways."

Despite all the drawbacks, developments in car design and in car equipment tending toward lighter weight, greater efficiency, attractiveness and comfort have been marked during the past five years. Railways that have been able to take advantage of these developments have benefited greatly through operating economies and through increased traffic. High cost of new equipment, however, has prevented many companies from keeping pace with these developments. For this reason the committee had in mind in the selection of typical cars the importance of reducing the cost to the railway.

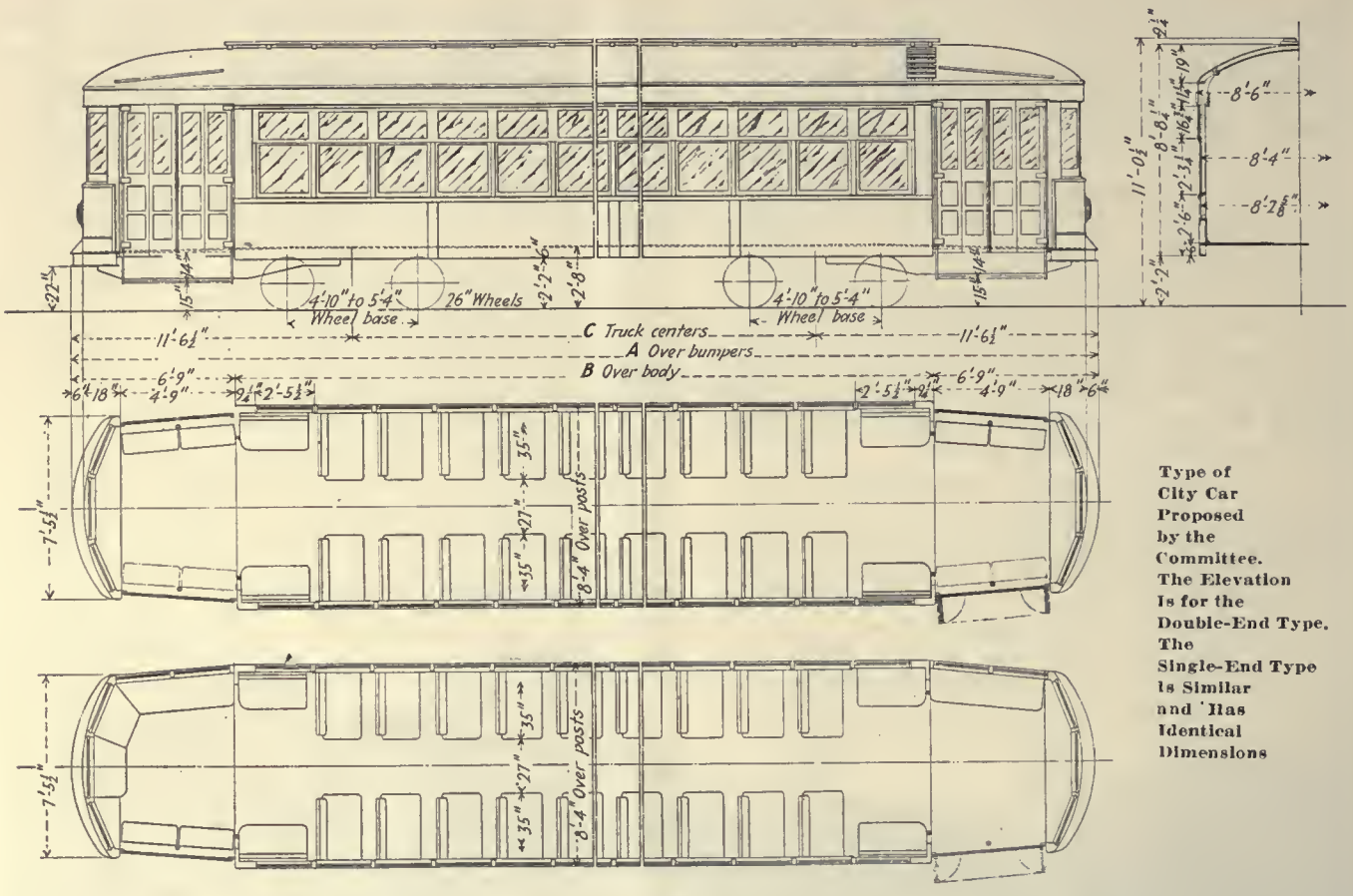
There is little possibility of reduction in material and labor costs. On the other hand, cars have been built in accordance with plans and specifications produced largely by the individual electric railway companies, with the result that scarcely any two lots of cars, even on the same property, are alike. Consequently, it has not been possible to take advantage of manufacturing economies incident to quantity production. The committee "is firmly convinced that substantial savings can be realized through general agreement on certain basic features of car design that will permit an approach to quantity production and the elimination of useless waste in the car-building industry. The possibility of effecting such savings lies entirely in voluntary co-operation on the part of both the electric railway companies and the manufacturers." The committee states that if its recommendations are to bear fruit, a co-operative movement must be organized for bringing about general agreement on, and adoption of, certain fundamental features of design. It is purely a problem in economics.



Modern Two-Car Multiple-Unit Train of the Pittsburgh Railways. This Is Typical of the Equipment Both for City and Interurban Service

At the outset, the committee was able to utilize the information gathered by the committee on unification of car design appointed by the American Electric Railway Engineering Association in 1921. In the five years that committee has been functioning it has collected and analyzed a vast amount of data on car design.

To develop further information on which to base fundamental dimensions, weight, and arrangement of a typical series of cars to meet average operating conditions for city and for interurban service, the new committee requested each car manufacturer to submit drawings and weights of light-weight, low-floor cars built in recent years. As a result of this request, data were received from nearly all the leading car builders. This information was studied by the committee.



Type of City Car Proposed by the Committee. The Elevation Is for the Double-End Type. The Single-End Type Is Similar and Has Identical Dimensions

PROPOSED CITY CAR—LENGTHS, SEATING CAPACITIES AND WEIGHTS

Double-End Cars

Number of Windows in Body	Length: Over Bumpers "A" Ft. In.	Length: Over Body "B" Ft. In.	Truck Centers "C" Ft. In.	Seating Capacity	Maximum Weight: Four 25-Hp. Motors	Maximum Weight: Four 35-Hp. Motors
12	44 6½	31 0½	21 5½	48–56	32,000	37,000
11	42 1	28 7	19 0	44–52	31,200	36,200
10	39 7½	26 1½	16 6½	40–48	30,400	35,400

Single-End Cars

Number of Windows in Body	Length: Over Bumpers "A" Ft. In.	Length: Over Body "B" Ft. In.	Truck Centers "C" Ft. In.	Seating Capacity	Maximum Weight: Four 25-Hp. Motors	Maximum Weight: Four 35-Hp. Motors
12	44 6½	31 0½	21 5½	48–62	31,000	36,000
11	42 1	28 7	19 0	44–58	30,200	35,200
10	39 7½	26 1½	16 6½	40–54	29,400	34,400

It was developed that certain dimensions, weights and other features of cars built by various manufacturers were in close agreement. Comparison of such dimensions with those recommended by the committee on unification of car design in 1922 for city cars showed little variation. The data submitted by the manufacturers showed that a large majority of the cars recently built have been of the end-entrance and exit type. A few designs of end-entrance and center-exit cars submitted were individual in design and applied to special operating conditions. A few designs of single-truck cars were also submitted by the manufacturers. A study of the trend of car purchases during the past ten years indicated clearly that the trend of purchase has generally been toward the double-truck type of car. The single-truck Birney car or modifications thereof is fairly well standardized and all the manufacturers are prepared to build it should it be desired.

Principal Features Considered in Typical Cars

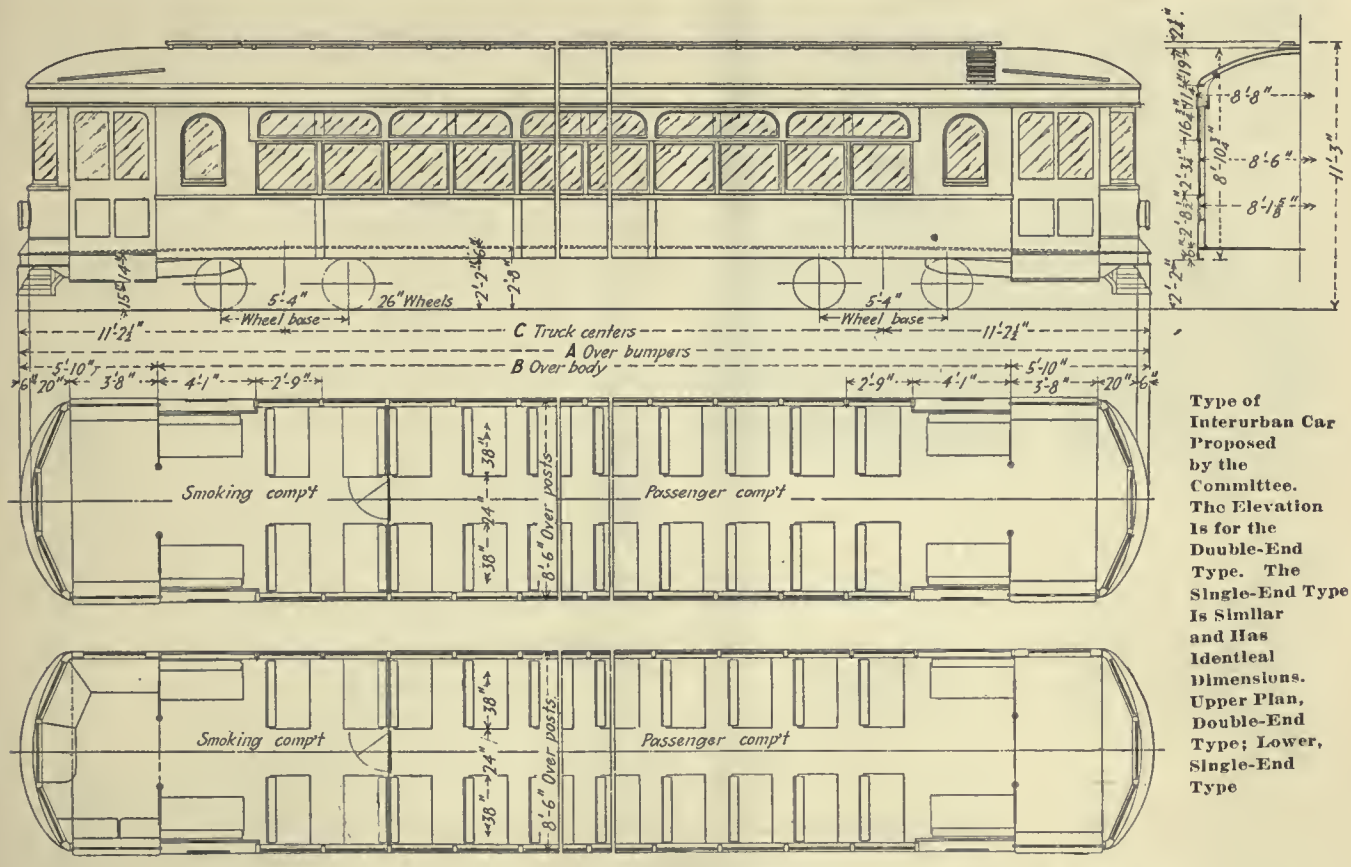
In the selection of the series of typical cars submitted by the committee, some of the important features kept in mind are as follows:

1. Light-weight, low-floor type.
2. Operation by either one man or two men.
3. Single or double-end operation.
4. Average city clearance conditions.
5. Quadruple equipment of motors, ranging 25 to 40 hp. for either single car or train operation.
6. End entrance and exit to permit circulating passenger movement.

With these basic ideas in mind, the three primary elements considered by the committee were size, weight and arrangement. Details of trim and specialties are left entirely to the option of the purchaser and the car builder. This permits individuality, and the designs selected allow the use of all known specialties. The committee believes that the cars selected afford a basis for general agreement except on certain interurban properties where heavy equipment with free running speeds of 60 m.p.h. or higher is considered essential. The designs selected by the committee are not applicable to rapid transit, subway and elevated service, nor has it considered articulated cars.

It is believed that the design should stimulate car manufacturers to develop cars embodying basic dimensions and other features recommended by the committee. The manufacturer, however, is not limited in developing attractive features intended to stimulate traffic.

The committee points out a number of distinct advantages to the industry from the adoption of its recommendations, which, however, cannot be realized to any great extent without the whole-hearted co-operation of



Type of Interurban Car Proposed by the Committee. The Elevation Is for the Double-End Type. The Single-End Type Is Similar and Has Identical Dimensions. Upper Plan, Double-End Type; Lower, Single-End Type

PROPOSED INTERURBAN CAR — LENGTHS, SEATING CAPACITIES AND WEIGHTS

Double-End Cars

Number of Windows in Body	Length Over Bumpers "A" Ft.	In.	Length Over Body "B" Ft.	In.	Truck Centers "C" Ft.	In.	Seating Capacity	Maximum Weight Four 25-Hp. Motors	Four 35-Hp. Motors	Four 40-Hp. Motors
12	47	4	35	8	24	11	48	.....	37,000	40,000
11	44	7	32	11	22	2	44	.....	36,100	39,100
10	41	10	30	2	19	5	40	28,200	35,200	38,200

Single-End Cars

Number of Windows in Body	Length Over Bumpers "A" Ft.	In.	Length Over Body "B" Ft.	In.	Truck Centers "C" Ft.	In.	Seating Capacity	Maximum Weight Four 25-Hp. Motors	Four 35-Hp. Motors	Four 40-Hp. Motors
12	47	4	35	8	24	11	57	.....	36,000	39,000
11	44	7	32	11	22	2	53	.....	35,100	38,100
10	41	10	30	2	19	5	49	27,200	34,200	37,200

both manufacturers and operators. Where the manufacturer adheres to the uniform designs, such as those recommended, it will result in:

1. Uniformity in dimensions which will permit the purchase of raw material in larger quantities.
2. Reduction in engineering expense.
3. Fabrication of parts on a quantity basis.
4. Simplification of the manufacturing process through the elimination of the endless variety of jigs, fixtures and dies.

The advantages to the electric railways that will result from widespread adoption of the committee's recommendations are:

1. Lower cost of cars.
2. Lower maintenance cost resulting from simplification of purchases and storing of parts.
3. Quicker deliveries of cars and renewal parts.
4. Interchangeability of cars among various properties, particularly those operated by the same management.

Basic Features of Design

If the advantages enumerated above are to be obtained, those features of design upon which general agreement is necessary are:

1. Width over posts.
2. Post spacing.
3. Height from bottom of sill to top of roof.
4. Diameter of wheels.
5. Wheelbase.
6. Step heights.
7. Type of roof.
8. Floor height.
9. Flush floor with ramped platform floor.
10. Stationary top window sash. Lower sash to raise behind top sash and letterboard so as to give a clear vision opening.
11. Standard glass sizes.

On these points, the committee states:

"With general agreement on those details, it should be possible for each car builder to proceed to design his own distinctive product and arrange to build such cars on a quantity basis. But if a sufficient part of the electric railway industry will not get behind such a unification scheme, giving up some of the ideas which have been responsible for the almost endless variety of cars, no benefit will result. For that reason, your committee earnestly recommends that the association take a poll of the industry to see how many companies will agree to purchase cars in which the fundamental features, incorporated in the cars recommended herein, are adhered to."

Drawings prepared by the committee were submitted to the committee on unification of car design, which approved the drawings of a series of typical cars and stated that there should be included a statement pointing out the practical stress limitations at certain critical

Table I—Comparison of Old and New Equipments on Roads Considered in Report

Company	Year	Miles		Class of Service	No. of Passenger Cars		Weight Complete, Lb.	Seats	Wheel Diam., In.	One or Two-Man	Motors		Control	Car Speed at 600 Volts, M.p.H.	Grade
		Route	Track		Total Active	New					No.	Hp. Each			
Interstate St. Ry.	1925	24	...	City	11	8	31,000[1]	44	26	1–2	4	25	K 35	..	Level
Penna.-Ohio Electric Co.	1925	19.4	...	Interurban	5	5	37,000	48	26	1	4	35	K 35	40	Level
Beaver Valley Traction Co.	1920	...	...	City and Suburban	..	..	36,000	38	33	2	4	25	K	..	Heavy
	1925	...	36			20[2]	16,500	32	26	..	2	25	..	..	
					34	6[1]	32,000	40	28	1	4	35	K	37	
Ohio Valley Electric Ry.	1923	...	...	City and Suburban	51	..	26,000 to 58,000	56[3]	33	2	..	..	K, M	..	Light
	1925	...	46		46	40	37,800	48	26	1–2	4	35	K	35	
Illinois Traction System	1925	101	...	Interurban	17	17	37,000	54	26	1	4	35	K 35	40	Rolling
United Electric Railways	1925	239	...	City	515	175	30,000	38	26	1–2	4	35	K 35	..	Rolling
Warren & Jamestown Street Ry.	1920	...	...	Interurban	5	..	60,000	46	33	2	4	60	K	..	Average
	1925	22	...	Interurban	5	3	36,000	50	26	2	4	40	K	40	
Pittsburgh Railways	1920	...	...	City	1,339	327	24,000 to 48,000	28 42	33	2	2 4	55 60	K	..	Heavy
	1925	...	599	City	1,502	795	38,000	56	26	1–2	4	40	K, Mu	35	
Lewistown & Reedsville Electric Ry.	1923	...	...	Interurban	22	..	58,000[3]	50	33	2	4	50	K	36	Moderate
	1925	9	...	Interurban	22[4]	4	36,000	48	28	1–2	4	35	Mu	40	
M lford & Uxbridge Street Ry.	1923	...	...	City and Suburban	42	..	42,800	44	34	2	4	40	K	..	Light
	1925	...	36		42	6	32,000	44	28	1	4	25	K	34	
Cumberland Traction Co.	1921	...	...	City and Interurban	..	..									None
	1925	...	15		9	4[2]	16,500	32	26	1	2	25	K	..	
						3[1]	32,000	48	26	1	4	25	K	35	

[1] Double truck. [2] Single truck. [3] Maximum. [4] Only five regular cars required, new cars do substantial part of total mileage.

points in the car structure. The statement submitted by the committee on unification of car design follows:

1. Car body should be designed to carry under service conditions the maximum live load for which it is designed in addition to its own dead weight.

2. The direct stress in the body bolsters, platform arms, and side frame girder, due to maximum static load, must not exceed 12,000 lb. per square inch of either tension or compression.

3. The combined stress in the body bolster, due to carried load, plus the stress due to the tractive pull of the truck and application of the brakes must not exceed 16,000 lb.

4. All connections should be designed for the maximum load to which the member connected may be subject. The secondary stresses in any member caused by eccentric loads should be combined with the direct stresses in such members. The fiber stresses (except in body bolster, referred to in paragraph 3) may be taken at 20 per cent greater than those given in paragraph 2, but the direct stresses considered alone must not exceed the 12,000 lb. above stated.

5. The report of the committee on unification of car design of 1922, Fig. 2, gives the typical stress analysis of a car body. Proper provision must be made in the side girder to prevent buckling over the bolster.

6. The permissible stresses above given are predicated on steel having the characteristics called for in A.S.T.M. specification No. A-11-24. Structural steel for cars. Where other materials are used, they should bear the same proportion to ultimate strength of material used.

The City Car Recommended

The type of city car selected for city service is shown in the drawing on page 1088. Both single-end and double-end designs are shown. These may be built in three sizes, with ten, eleven, or twelve side windows, giving seating capacities of 40, 44 and 48, and a maximum available seating capacity of eight more in each case if folding seats are used. The single-end car is similar, having seating capacity of 40, 44 and 48 inside the body, the maximum available seating capacity in each case being increased by fourteen more on the platform.

The design is such that when the car is equipped with four 25-hp. motors, double-end single-car control and all safety features, the maximum weight will not exceed 32,000 lb.; when equipped with 35-hp. motors, double-end train control and safety features generally in use, the maximum weight will not exceed 37,000 lb. Weights of the single-end cars will be approximately 1,000 lb. less than those given.

The use of 40-hp. instead of 35-hp. motors will increase the weight approximately 1,000 lb. These are extreme weights. The complete weights specified are primarily limits for the car construction and not for motor selection. Service conditions may require the use of 35-hp. motors on 32,000-lb. cars and in some cases 35-hp. motors may be used on cars weighing more than 37,000 lb. In general, the 35-hp. motor is considered satisfactory for the 37,000-lb. cars.

With regard to weights, the committee states:

"It is greatly in the interest of the operating company to keep the car weights as much lower than the maximum figures given as may be consistent with good practice to suit the various operating conditions. It is

the feeling of the committee that substantial weight reductions can be made in many instances. The way is left open for the exercise of ingenuity by car builders in the design of body structures and in the selection of materials to give minimum weight consistent with adequate strength."

Features of Interurban Cars

Drawings of the cars selected for interurban service are shown on page 1089. The use of different numbers of windows proposed is similar to that for the city car, and the seating capacities vary accordingly. The plan submitted shows a smoking compartment, the seating of which can be varied by moving the partition. This compartment may be located at either end of the car as desired. A toilet of one or two window lengths may be installed by removal of one or two seats.

The design of the car is such that when equipped with four 35-hp. motors, double-end single-car control and safety features generally in use, the maximum weight will not exceed 37,000 lb. If 40-hp. motors are substituted, the weight should not exceed 40,000 lb. In some cases, the ten-window car may be equipped with four 25-hp. motors with double-end single-car control and safety features without exceeding 28,200 lb. In each case the single-end car will weigh about 1,000 lb. less. On level tangent track and with approximately 600 volts on the trolley, these cars are capable of free running speeds of 45 to 50 m.p.h.

For both the city and interurban cars, the tables given under the drawings indicate the ruling dimensions and weights for the various lengths and seating capacities.

The committee was impressed by the trend during the past four or five years toward a type of car suitable for operation by either one man or two men. This has been the means of effecting substantial operating economies. All of the cars recommended by the committee may be arranged for one-man operation, one-man, two-man operation or straight two-man operation.



Seats in the New Double-Track Cars of the Interstate Street Railway Are Upholstered in Gray Plush

Certain modifications in the designs submitted may be made without destroying the essential features of standardization. For instance, maximum traction trucks may be used on the city car with 28-in. driving wheels and two 60-hp. motors by using drop platforms. The car body from corner post to corner post may be built exactly like those shown in the drawings, thus preserving to a large extent the economies and advantages claimed by the committee for the general plan of unification. On the interurban car sliding doors have been shown because the committee believes that this type of door is best suited for the class of service. Fold-



One of Eight New Cars for the Interstate Street Railway, Attleboro, Mass. These Have Shown a Saving at the Rate of 65 per Cent on Their Cost

Table II—Comparison of Operating Expenses Showing Reduction in

	Interstate Street Railway		Pennsylvania-Ohio Electric Co.		Beaver Valley Traction Co.		Ohio Valley Elec. Railway		Illinois Traction System [4]		United Electric Railways Providen	
	1925[2]	1925[3]	1922	1925	1920	1925	1923	1925	1923	1925	1921	1
Way and structures	4.10	2.38	7.07	7.43	5.28	3.93	4.67	4.59	8.54	5.59	9.22	8
Equipment	8.11	3.14	6.19	2.66	5.62	3.77	2.88	2.55	5.24	3.11	5.99	6
Power	8.80	5.43	8.52	5.46	5.43	4.56	4.00	3.44	10.24	5.27	6.07	5
Conducting transportation	13.06	9.02	13.94	12.67	14.63	10.17	11.69	9.47	13.68	8.83	19.45	16
General and miscellaneous[1]	3.52	5.93	11.68	11.30	6.99	8.67	8.09	7.55	7.54	4.80	4.15	4
Total	37.59	25.90	47.40	39.52	37.95	31.10	31.33	27.60	45.24	27.60	44.88	41

[1] Includes traffic. [2] January, February, March. [3] September, October, November. [4] Illinois Valley Division

ing doors could be substituted without any serious modification in the design. In order that other details of style may be varied without affecting the essentials of design, many detailed dimensions are not given on the drawings.

The committee points out that the advantages which will result from the use of a uniform car will be increased if standard equipment parts are used throughout, such as the association's standard axles, wheels, brakeshoes, etc. As an example, the motor manufacturers carry in stock motors suitable for standard A.E.R.E.A. axles. If for a given maximum weight a larger axle is used, a special form of motor must be supplied to accommodate this increased diameter, which will mean a serious delay in shipment and a consequent increase in price.

Further Research and Experiment Urged

The tendency during the past ten years toward low-floor, light-weight cars is noted by the committee, as well as the more recent distinct trend toward a more attractive appearance, together with more comfortable seats, improved lighting systems, and more up-to-date interior equipment. Another feature discussed is that of noise reduction. Roller bearings, automotive type brakes and other innovations have been tried out in Grand Rapids and elsewhere for the purpose of reducing noise. The committee also points out that improvements along these lines can be made without in any way departing from the basic features of design recommended.

Economies Produced by Recent Cars

In order to emphasize the soundness of its position in recommending new and improved cars for electric railway service, the committee gives a series of accounts showing actual economies resulting from the substitution of modern light-weight cars for old heavy-type cars on eight properties. In addition, a table is included showing in greater detail the results of operations of the new cars on these and other properties.

On many other roads it was found that both new and old equipments are being operated, but without any segregation of operating expenses between old and new vehicles. This made it impossible for the managements to ascertain what actual savings had resulted from operation of the new cars. In consequence the committee strongly recommends that operating companies segregate these accounts so that actual economies in operation and maintenance, as well as the revenue-producing possibilities with new equipment, can be ascertained. This matter of segregation of accounts is considered important also in determining the point at which it becomes more profitable to scrap the old equipment and purchase new.

Experience of Interstate Line Impressive

On the Interstate Street Railway, Attleboro, Mass., five 31,000-lb., 44-passenger, double-truck, and three 16,000-lb., single-truck, one-man cars were purchased to replace the 45,000-lb. type then in use. The double-truck cars were equipped with four 25-hp. motors, and the single trucks with two 25-hp. motors, with type K control. The seats are covered with plush and are comfortable, while the exterior painting, in a combination of red and cream, makes the cars very attractive. These cars were put in service in July, 1925.

The road operates between Plainville, North Attleboro, Attleboro, South Attleboro, in Massachusetts, and Pawtucket, R. I., about 24 route-miles. The service calls for five ten-second stops per mile. The cars make about 11.3 m.p.h. Schedule speeds have been increased so that one car has been eliminated. This has been due primarily to better line voltage and faster passenger interchange, due to the lighter low-wheel cars. One-man operation is now in effect on all lines, excepting on that portion known as the Attleboro Branch Railroad, where heavier riding requires two men.

It has been found possible to use a semi-automatic substation, which is adjacent to the carhouse, so that a shop man looks after it, releasing three men. On account of the lessened repair work with the new cars, there has been a further reduction in the shop force.

The cars have been in use for such a short time that operating figures for a full twelvemonth period are not available. In Tables II and III are, therefore, comparisons of January, February and March with September, October and November, both in the year 1925. Weather and traffic conditions were quite similar for these periods. Reductions in operating costs per car-mile in the account affected by the new cars are: Equipment, 61 per cent; power, 38 per cent; conducting transportation, 31 per cent, or a total of 33 per cent. The management has been able to reduce other costs also, so that the total expense per car-mile has gone down from 37.59 cents to 25.9 cents. If the savings attributable to the new cars continue, they will be at an annual rate equivalent to 65 per cent on the $84,000 investment in the new cars.

One of the outstanding results which have been obtained is the co-operation of the public. During the receivership the situation was so bad that the Attleboro

h Modern Cars

arren & mestown Street Railway		Pittsburgh Railways		Lewistown & Reedsville Elec. Ry.		Milford & Uxbridge Street Ry.		Cumberland Traction Co.	
20	1925	1920	1925	1923	1925	1923	1925	1921	1925
87	2.85	9.81	6.28	4.71	3.27	5.07	3.61	4.84	2.70
35	1.55	6.91	5.63	1.86	1.72	3.09	3.25[5]	6.52	3.20
25	7.75	6.30	5.05	12.63	7.11	8.15	6.72	6.36	4.60
18	9.18	19.22	18.31	16.00	13.83	14.92	10.40	8.75	7.00
54	4.67	4.96	7.18	2.70	2.67	2.97	2.57	3.40	3.51
19	26.00	47.20	42.45	37.90	23.60	34.20	26.55	29.82	21.01

rhauling old cars included.

residents had to decide whether they wanted car service continued or replaced with buses. Nearly every one wanted the railway to continue. As a result, the municipal authorities have tried hard to assist its management in every way. School children's fares have been increased, the company has been relieved of the necessity of furnishing liability bonds for its buses and permits have been refused to independent operators who wished to compete with the railway's local buses.

During the latter part of 1925 there was a business recession in the districts served, so that no increase in passenger revenue resulted at that time from the use of the new cars. However, it is significant that in March, 1926, there was an increase in passenger revenue of 17 per cent over the preceding year.

Pennsylvania-Ohio Electric Company Finds New Cars Advantageous

On the 20-mile line of the Pennsylvania-Ohio Electric Company, between Youngstown, Ohio, and New Castle, Pa., half-hour service was formerly operated with four regular cars. In 1922 conditions became so bad that it was deemed impracticable to continue the schedule. The logical thing seemed to be to give half-hour service from Youngstown to Lowellville and one-hour service from Lowellville to New Castle. The change was made when the new one-man cars were put in operation in 1923. The revised schedule reduced the car mileage, but not



The Interior of the P-O Car Is Attractive and Pleasing to the Passengers

the number of regular cars. It must be remembered that the railway would in any case be operating the present schedule regardless of whether or not new cars were installed.

The new cars weigh 37,000 lb., compared with 54,000 lb. for the old cars. They have four 35-hp. motors as compared with four 90-hp. motors on the old cars. The new cars are attractive and comfortable. There are no hanging straps to obstruct the passengers' view and no advertising signs. Amply spaced plush seats are used. The new cars are geared for about 40 m.p.h., and make the trip from Youngstown to New Castle in 60 minutes. This schedule is made with about 1.4 stops per mile, of eight seconds each.

One-man operation was a success from the start. There has been a considerable reduction in equipment maintenance, power costs and platform expense. The new cars take about 2.76 kw.-hr. per car-mile, as compared with 3.83 for the old cars, a saving of 28 per cent. Equipment maintenance has been reduced 51 per cent and platform expense 15 per cent, the total being 30 per cent less than the former cost.

In Tables II and III the comparison of operating costs is given, with the 1922 mileage adjusted to com-



One of the Four Pennsylvania-Ohio Cars That Have Been Earning 41 per Cent a Year on the Investment

Table III—Gross Return on Investment in Modern Cars Is from 15 to 65 per Cent

Savings in	Intersrate Street Railway	Pennsylvania-Ohio Electric Co.	Beaver Valley Traction Co.	Ohio Valley Elec. Railway	Illinois Traction System[3]	Warren & Jamestown St. Ry.	Pittsburgh Railways	Lewistown & Reedsville Elec. Ry.	Milford & Uxbridge Street Ry.
Equipment	$4,868[1]	$12,270	$32,450	$12,900	$29,592	$4,230	$818,000	.....	.....
Power	4,320[1]	10,720	7,150	12,240	15,477	750	.....	.....	.....
Conducting transportation	4,515[1]	7,075[2]	63,350[2]	51,000[2]	292[2]	.....	206,000	.....	.....
Total	$13,703[1]	$30,065	$102,950	$76,140	$45,361[4]	$4,980	$1,024,000	$8,850	$31,245
Approximate investment in new cars	$84,000	$72,500	$196,000	$500,000	$186,000	$39,000	$7,000,000	$42,000	$77,650
Gross return on investment, per cent	65	41	52.5	15.2	41	12.8	14.6	19.7	.....

[1] Three months, total prorated to twelve months, $54,812. [2] Platform only. [3] Illinois Valley Division
[4] Increased revenue $33,000; total savings and increased revenue, $78,361.

pare with that run in 1925. On this basis there was a saving of $30,000 in the items of equipment, power and platform labor. On an investment for five new cars which approximates $72,500 the gross return figures out 41 per cent.

Beaver Valley Traction Company Modernizes Its Rolling Stock

In the retirement of old cars and making replacements with modern types the Beaver Valley Traction Company has been very active. This company, with a total of 36 track-miles, serves a number of communities in the Beaver Valley having a population in excess of 70,000. The grades and curves are relatively severe, with the result that the demand on equipment is more or less difficult.

The modernization program began in September, 1920. At this time, and in August, 1921, twenty standard safety cars were purchased. In November, 1923, six modern light-weight double-truck cars were added. These latter cars are of the one-man, two-man type, with four 35-hp. motors. They weigh 32,000 lb. and seat 40 passengers. These cars replaced 36,000 lb. double-truck semi-convertible cars equipped with four 25-hp. or four 40-hp. non-interpole motors. It is interesting to note that no extremely heavy cars have been operated and that a large proportion of modern equipment has been in service for a number of years.

The average schedule speed is for all of the lines, including layovers and 10 m.p.h., with six ten-second stops per mile. Seventeen cars are required for the regular schedule and twelve extras are run during rush hours. When new cars have been placed in service headways have been reduced. For this reason not all of the old cars have been retired.

Results have been so good that it is felt by the management that without the use of modern cars and a change to one-man operation it would not have been practicable financially to continue operating the property. As shown in Tables II and III, operating costs have declined and further improvements in this respect are anticipated. The principal savings have been in car maintenance, power and platform labor. The total saving in 1925 as compared with 1920 is $102,950. The approximate investment is $196,000, so that the return on this is approximately 52.5 per cent. It is also interesting to note that during the past four years this railway has financed improvements to the extent of more than $400,000 out of net revenue. The six modern double-truck cars purchased in 1923 were paid for on the basis of 25 per cent cash and the balance in one year, all out of earnings. These cars cost about $11,000 each.

Ohio Valley Electric Railway Has 100 per Cent Modern Equipment

During the latter part of 1923 the Ohio Valley Electric Railway made a complete replacement of all its rolling stock on the lines operated in Huntington, W. Va.; Ashland, Ky., and the suburban route between the two cities. There are four city lines in Huntington and one in Ashland, while the 16-mile connecting line serves a number of intermediate communities. The city lines in Ironton, Ohio, are not included in the equipment replacement. The property comprises 46 track-miles, serving a population in excess of 150,000. As the territory is adjacent to the Ohio River, the grades are comparatively light.

The forty modern light-weight cars which give the entire service weigh 37,700 lb. complete and seat 48 passengers each. They are equipped with four 35-hp. motors. The old rolling stock which they replaced consisted of four single-truck, two-motor cars weighing 26,000 lb. complete, fourteen double-truck, two-motor cars weighing 39,000 to 47,000 lb. and 33 double-truck, four-motor cars weighing 46,000 to 58,000 lb. Twenty-two of the latter had a complete weight of 54,000 lb. or more. The old cars had 33 to 34-in. wheels and all but ten were equipped with various types of obsolete non-interpole motors.

With the installation of new cars a substantial increase was made in the mileage, there being an increase of 12 per cent in 1925 as compared with 1923.

Regarding the operation of the system, the committee says:

"A very interesting fact in connection with the operation of the Huntington-Ashland suburban line is that with modern cars it is possible to maintain the same headway with two less cars. The line originally required twelve cars to provide a fifteen-minute headway, and the same service is now performed with ten cars. The round-trip time, including layover, has been reduced from 180 minutes to 150 minutes, a saving of 16⅔ per cent, and no difficulty is experienced in keeping the modern cars on time. Also, this improvement has been effected without an increase in the free running speed of equipments (except for voltage improvement,

due to the use of lighter cars) as the modern cars are geared for the same car speed as those replaced. High-speed operation is restricted, due to frequent stops, therefore the rapid accelerating and braking rates of the modern cars account, to a considerable extent, for the schedule improvement."

Since some of the modern cars were in service during the last two months of 1923, that year is not entirely representative of old car operation. The reduction in operating costs is, however, quite striking. Actual car maintenance is interesting, as shown by the following costs:

	Cents per Car-Mile		
	1923	1924	1925
Account 30, Passenger and combination cars..	1.00	0.71	0.73
Account 31, Electrical equipment of cars.....	0.51	0.25	0.20

In 1925 there was a reduction of 27 per cent for account 30 and 61 per cent for account 33 from the figures of 1923. It is also interesting to note that the expenditures for maintaining the old cars was reduced to a minimum during their last year of operation.

The modern cars cost approximately $12,500 each, representing a total investment of $500,000. They were purchased on the car trust plan. The total saving of $76,140 in operating expenses shows a return on this investment of 15.2 per cent. While operating revenues have decreased, the management feels that the decline would have been much more drastic if modern cars had not been put in service. The economy of the new equipment enabled the company to continue operation at a profit.



One of the New Providence Cars. These Have Reduced Expenses and Have Cut Pull-Ins to Less Than Half What They Were Before

Illinois Traction Adopts Light-Weight Cars

In 1923 the interurban passenger cars of the Illinois Valley Division of the Illinois Traction System weighed 94,000 lb. Each was equipped with four 100-hp. motors and service was given on a two-hour headway. This line consists of 101 miles of road, extending from Joliet 85 miles westerly to Princeton, with a 16-mile branch from Ottawa to Streator. City cars are also operated in the adjoining cities of La Salle and Peru. A freight and express service is conducted over the interurban route.

During 1924 the heavy cars were replaced by seventeen new single-end light-weight one-man interurban cars seating 54 and weighing only 37,000 lb. These cars are equipped with four 35-hp. motors. With the new equipment the headways were decreased to one hour, doubling the service. Passenger comfort was featured in these new cars. They are geared for about 40 m.p.h. and make an average schedule speed of 21.4 m.p.h., with one 35-second stop per mile. Ordinarily passengers enter and leave by the front door. At heavy loading points the rear door may be operated by a valve and fares collected by a street collector.

The interurban operating costs for these accounts were reduced by the use of these cars as follows: Equipment, 73 per cent; power purchased, 42 per cent; platform service, 27 per cent. There has been a reduction of 33 per cent in the shop force, although there are now two more city cars in La Salle and Peru. In 1923, 92 per cent of the 22,239 trains operated were on time. In 1925 this was increased to 97.2 per cent of the 32,858 trains on time. With an increase of 70 per cent in interurban passenger car mileage, operating expenses in 1925 were about $39,000 less than in 1923. Meanwhile, the passenger revenue increased $33,000. The total gain of $72,000 represents a gross return on the investment of about 39 per cent. Detail figures are given in Tables I, II and III.

Providence Makes Large Saving

Prior to the modernization program of the United Electric Railways of Providence, R. I., 41,000-lb. two-man cars were being operated. Early in 1922, 25 Birney cars were placed in service. About the middle of the next year 150 one-man, two-man cars were added. At present 222 cars are required in base service and a total of 1,242 in rush hours. With the advent of the new cars 222 closed and 269 summer cars were taken from service. At the present time 79 per cent of the cars in base service are of the modern, low-wheel type. In addition, 35 double-truck cars were received in June, making the equipment for base service 85 per cent modern and 100 per cent one-man operated.

About the time of the advent of the new cars a number of changes were made in routing, service and fare collection methods. These have been detailed in ELECTRIC RAILWAY JOURNAL. They have resulted in considerable improvement to service.

Average schedule speed is 8.8 m.p.h., with about 8.5 stops per mile. Schedules were slowed down somewhat when the one-man cars were introduced. It is now felt that it may be possible to increase schedule speed, and a study is being made for that purpose.

It is somewhat difficult to give definite figures of savings in equipment, power and platform expense which may be credited to the new cars. There is no question but what these accounts have been materially reduced and better service provided. Expenditures in account 30, passenger and combination cars, and account 33, electrical equipment of cars, have been reduced 10 per cent and 20 per cent respectively for 1925 as compared with 1921, even though a complete overhaul of cars has been under way for the last year and a half. Pull-ins were 0.67 per thousand miles in 1921 as compared with 0.292 for the first eight months of 1925, a reduction of more than 50 per cent.

Showing the trend, energy consumption may be compared in the city of Pawtucket. In that city 25 new double-truck cars weighing 30,000 lb. recently replaced 25 older cars weighing about 39,000 lb. This change resulted in a reduction of 54,120 kw.-hr. for April, 1926, as compared with last year, representing an annual saving of about 650,000 kw.-hr. Platform expense has been reduced nearly 20 per cent as compared with 1921, even though operators got nearly 20 per cent higher wages than they did in that year. Tables II and III give details of the savings.

EXPENSES REDUCED ON WARREN & JAMESTOWN

Results with modern cars have been very satisfactory on the Warren & Jamestown Street Railway, both from a financial and an operating standpoint. The property consists of a 22-mile interurban line between the two cities. Grades are heavy, in a number of cases being 8 to 10 per cent.

The former rolling stock on the interurban lines consisted of five double-truck cars weighing 50,000 to 60,000 lb. complete. These cars were eighteen to twenty years old, although the motors had been replaced by those of interpole type. In 1923, three modern light-weight, low-floor cars weighing 36,000 lb. complete were purchased to improve service and reduce operating cost. They seat 50 passengers and have long comfortable cross seats. The electrical equipment consists of four 40-hp. motors. When the new equipment was put in service a reduction in running time of five to ten minutes was made. Otherwise, the schedules remained the same. It is considered possible to reduce the running time sufficiently to take one of the three cars out of service and maintain the schedule with two cars. Originally it was planned to run the new cars with one man, but this has not been done. Such operation offers an excellent possibility of further economy.

As shown in Tables II and III, there has been a reduction in operating expense of 41 per cent. The most striking saving is in maintenance of equipment. Account 30, passenger and combination cars, went down from 1.35 cents per car-mile in 1920 to 0.79 cent in 1925, or 31 per cent; while account 33, electrical equipment of cars, dropped down from 1.05 cent per car-mile in 1920 to 0.28 in 1925, or 73 per cent. The total represents a reduction from 2.4 to 1.07 cents per car-mile. It will be noted that the cost of maintaining the old cars was unusually low.

A new concrete highway has been built paralleling the road the entire distance. This adversely affected earnings so that gross revenue went down from 56.25 cents per car-mile in 1920 to 37 cents per car-mile in 1925. Despite this, the total operating expense was reduced 34.19 cents in 1920 to 26 cents in 1925, so that the net revenue went down only from 12.06 cents to 11 cents per car-mile, which is not materially lower.

With the new cars and operating economies, it has been possible to reduce expenses sufficient to keep the property on a paying basis. Future improvements in service will no doubt result in increased traffic and further reduction in operating expenses. Patrons are well pleased with the improvements that have been made.

PITTSBURGH RAILWAYS A PIONEER

Early in 1914, the Pittsburgh Railways began the operation of modern light-weight, low-floor cars. Addi-

Table IV—Age of Passenger Cars Representing 66 per Cent of the Industry

Based on ELECTRIC RAILWAY JOURNAL Questionnaire (March, 1926)

Geographic Division	New England	Middle Atlantic	East North Central	West North Central	South Atlantic	East South Central	West South Central	Mountain	Pacific	Total Cars
Date Built	Number of City Cars									
1921—1925	436	2,012	2,182	560	426	171	359	56	616	6,818
1916—1920	1,592	2,947	1,849	581	490	108	284	22	366	8,239
1911—1915	1,323	1,490	2,572	954	524	244	250	210	865	8,432
1906—1010	343	2,665	3,332	569	567	282	267	233	659	8,917
1901—1905	709	2,995	2,338	1,062	509	358	316	112	378	8,777
Prior to 1900	448	3,639	1,172	404	155	136	134	164	198	6,350
Total	4,851	15,648	13,445	4,130	2,671	1,299	1,610	797	3,082	47,533
Date Built	Number of Interurban Cars									
1921—1925	45	61	274	15	11	14	11	18	36	485
1916—1920	92	83	186	20	41	15	28	34	16	515
1911—1915	38	152	160	66	28	5	88	46	28	611
1906—1910	91	257	238	43	30	5	45	8	92	809
1901—1905	276	161	340	50	30	32	26	.....	84	999
Prior to 1900	61	71	96	21	19	.....	.....	6	69	343
Total	603	785	1,294	215	159	71	198	112	325	3,762
Total, city and interurban	5,454	16,433	14,739	4,345	2,830	1,370	1,808	909	3,407	51,295
Cars more than twenty years old	1,494	6,766	3,946	1,557	713	526	476	282	729	16,489
Per cent of total cars over twenty years old	27.4	41.1	26.7	36.1	25.2	38.4	26.3	30.9	21.4	32.1

tional cars have been purchased practically every year subsequent to that date. The present replacement program contemplates the retirement of all old and heavy equipment.

Conditions in Pittsburgh are familiar to readers of this paper. The business district of the city is located adjacent to the Allegheny and Monongahela Rivers and the hills are steep, with maximum grades of 8 to 10 per cent. Narrow streets and sharp curves limit the width of cars that can be used.

At present there are 795 low-floor cars in service, and 50 more on order. The city cars weigh complete from 33,200 lb. to 38,000 lb. There are 35 interurban cars included among the modern type, of which fifteen weigh 47,000 lb. complete, while the remaining twenty are similar to the city cars. All the cars have both end and center doors, and seat from 54 to 56 passengers. The standard equipment is four 40-hp. motors mounted on 26-in. wheels, although some of the earlier cars have 24-in. wheels.

Most of the old cars replaced were double-truck type with 33-in. wheels and weighed 48,000 lb. complete. The motors were obsolete types. A large number of old single-truck cars have also been superseded.

To fill the schedules on the 100 lines operated, 494 cars are required in the base schedule, 1,065 in the morning rush hour and 1,126 in the afternoon rush hour. With the modern cars, service improvements have been introduced. Headways have been cut on many lines, or else two-car train operation has been substituted for single units. Schedule speeds have not changed materially, though traffic congestion has increased to the extent that it is doubtful that they could have been maintained with the old equipment.

The new equipment and improved operating methods have naturally reduced operating costs. The comparison given in the tables between 1920 and 1925 indicates what can be accomplished by retiring old equipment.

Table V—Results with New Cars on Six Routes in Pittsburgh

Route No.	Cars	Daily Averages — Earnings	Daily Averages — Mileage	Increase, per Cent — Earnings	Increase, per Cent — Mileage
1	Old	$200	435	.....	.....
	New	245	434	22.5	0.0
4	Old	532	695	.....	.....
	New	570	895	7.14	28.78
26	Old	433	781	.....	.....
	New	523	912	20.78	16.78
34	Old	303	669	.....	.....
	New	355	832	17.16	24.37
87	Old	917	1,716	.....	.....
	New	1,004	2,047	9.49	19.45
96	Old	372	1,102	.....	.....
	New	451	1,408	21.23	27.76

They show a reduction of 10 per cent in operating costs per car-mile during the past six years.

The reduction in car maintenance expense is even more striking. Account 30, passenger and combination cars, has gone down from 3.06 cents per car-mile in 1920 to 2.20 cents in 1925, and account 33, electrical equipment of cars, from 2.26 cents in 1920 to 1.06 cents in 1925. The total expenditures have been reduced 39 per cent during the six-year period.

The new cars, which cost $15,000 each, have been acquired under the car trust plan, with payments in fifteen equal annual installments. The saving shown in Table III, totaling $1,024,000 on $7,000,000, amounts to 14.6 per cent on the investment.

As an indication of the results, the committee makes the following statement:

"Prior to the time when a general program for the retirement of obsolete equipment was inaugurated (1922), no return was being earned on the investment and it was not possible to pay old debts, paving charges and license fees. At present, the company is paying all

Tale V—Results with New Cars on Six Routes in Pittsburgh

Company Class	Annual Gross Revenue	Number of Passenger Cars — 1907	1912	1917	1922
A	Over $1,000,000	49,004	56,704	62,186	62,484
B	$250,000–$1,000,000	10,675	10,497	10,163	9,051
C	Under $250,000	10,337	8,961	7,565	5,766
Total	.....	70,016	76,162	79,914	77,301

Figures from U. S. Census Bureau reports.

operating expenses, taxes, old debts incurred prior to reorganization in February, 1924, paving and license charges, as well as earning a 6 per cent return on a valuation of $62,500,000. The interest and carrying charges on the investment in new equipment and 6 per cent of $5,000,000 borrowed in 1924 is also being earned. Undoubtedly, the operation of modern cars, with the resulting betterment in the character of the service provided, has contributed largely to the improved financial condition of the property. . . .

"Revenues were well maintained during the past few years, a period which has been very unfavorable for many railway properties.

"Although gross revenues per car-mile for 1925 are slightly lower than for the preceding years, the annual car mileage has been increased, and not only have gross revenues increased but the net income for 1925 was greater than for 1924."

These data on revenue apply to the entire system and do not indicate to what extent modern cars have caused improvement in this respect. Comparative data have been kept on certain lines when new equipment was installed, and the results on six routes are shown in Table IV.

Statistics Show Need for New Cars

Some interesting data were brought out by the committee concerning the present passenger car situation. A study of the United States Census figures shows that the number of passenger cars owned by electric railways with gross revenues of more than $1,000,000 a year increased rapidly from 1907 to 1917, while those of smaller systems have decreased, slowly for the companies between $250,000 gross revenue and $1,000,000 gross revenue, and rapidly for the companies of less than $250,000 a year. The figures are given in Table VI.

Approximately 81 per cent of all passenger cars in 1922 were owned by class "A," the group of large companies. Of the remaining 19 per cent, the middle-sized or class "B" companies owned 12 per cent, and class "C" companies, 7 per cent. It is important to note that despite the enormous increase in motor vehicle registration, which went up from 140,300 in 1907 to 10,864,128 in 1922, the cars owned by the large class "A" companies were still increasing in number.

As to the number of cars the electric railways may be expected to purchase annually in the future, the com-

mittee states: "That is a difficult question to answer, and it has been complicated by the advent of the motor bus. No one can predict the extent to which the motor bus will be utilized by electric railways in giving public transportation."

From 1907 to 1916, the electric railways purchased an average of 3,764 passenger cars per year. From 1917 to 1925, the average annual purchases went down to 2,353, or 62.4 per cent of the volume prior to the war. Assuming that the purchases before the war represented a fair average under normal conditions, there has been a deficit of 1,411 cars purchased per year, or a total of 12,699 cars. The motor buses purchased during the later period offset to some extent the deficiency in cars, although many of them have been placed in service as feeders to rail lines, and represent extensions to service.

Replacing of older cars with new and attractive equipment is an economic problem to be determined on each property. The data included in the report make it obvious that on certain properties modernization of equipment has been an essential in stimulating traffic and in reducing operating and maintenance costs. The committee believes that every railway should properly analyze its own situation to see what can be accomplished along similar lines.

The committee gives several tables showing by states and by geographical division the age of passenger equipment now in service. The figures are based on replies to a questionnaire by this paper, covering 51,295 cars or approximately 66 per cent of the total passenger cars in the industry. Table V gives a summary by geographical divisions of the information. It will be observed that 32.1 of all passenger cars reported were built more than twenty years ago. If that proportion is applied to the total passenger cars in the industry as given by the 1922 census report, there are in round figures 25,000 passenger cars in service today that were built prior to 1905. Commenting on this, the committee states:

"Since those cars were built there have been so many improvements in car design tending toward higher efficiency in operation, lower maintenance costs and greater safety and comfort for passengers that their replacement is a matter of vital importance. Car rides can be sold, but not on cars of the vintage of 1905."

Public Safety Demonstrated in El Paso

UNDER the guidance of Tom Walker, manager El Paso Electric Railway, El Paso, Tex., a program of safety stunts and playlets was staged last month. Besides running the railway and other utilities in El Paso Mr. Walker is chairman of the Forum Public Safety Committee, and it was under the auspices of this committee that the stunts were conducted. Amusement as well as instruction was afforded the audience who attended the two performances, one in the afternoon and the other in the evening.

Captain Stanley Good and his traffic force co-operated in several of the acts. The various features presented were "Tribulations of Traffic Police." "Vacation Hazards" was arranged by the Woman's Club and was directed to the school children of the city. "Automobile Hazards" and "Pedestrian Hazards" were arranged by auto dealers and the superintendent of play-ground teachers respectively.

Superintendent of Distribution J. E. Jordan of the El Paso Electric Company arranged the skit on "Street Car Hazards," and the superintendents of two steam railroads conducted a similar affair entitled "Steam Railroad Hazards."

Houston's Talking Cars from Old Equipment

Many Innovations Introduced to Attract the Attention of the Car Rider—Air-Operated Electric Signs Used Effectively

By F. J. Bennett

Master Mechanic Houston Electric Company, Houston, Tex.

PRONOUNCED popularity has resulted from the remodeling of certain old cars of the Houston Electric Company. Many of these cars were due for overhauling, and while accomplishing this maintenance work important changes were affected.

The heavy couplings were removed, effecting some economy of weight. The seats were covered with gray



All Piping Is Inclosed on the Remodeled Cars in Houston, Leaving No Pockets for Dust and Dirt to Collect. Note the Pockets Provided for the Operator's Punch and Transfers at the Left of the Casing

Kemi-suede, and floors were covered with ¼-in. rubber tile. On some cars we used a plain color of material and on others a tiled effect. Either style gives a clean floor and deadens much of the noise arising from the trucks and tracks.

All piping at the front of the car has been neatly incased in a wood compartment, which serves not only to conceal the unsightly pipes and fixtures so common to street cars but makes it possible to sweep and clean the platforms thoroughly.

The urge today is to get something different in designs and finish—something better, but, still, little things that change the appearance and attract attention we believe essential. For this reason we have not standardized on any particular color or finish. Some of the cars are refinished in the interior, using the natural wood colors, and on others we plan to enamel the wood trim, using agreeable colors similar to the newer type Pullman cars today.

The first few cars have been painted a white and cream on the exterior. This combination has been varied on others. The effect is startling and has attracted much favorable comment.



Houston's "Talking Cars"

Bodies are painted a white and cream combination and give the impression of new cars. The sign at the bottom of the right-hand vestibule window reads "Enter at Front." The green illumination of the sign does not photograph clearly. The illustration at the left shows a rear view of Houston's remodeled cars with the open screened-in vestibule. The treadle device has been installed for rear exit use. The red light observed flashes "Stop" when brakes are applied.

Another innovation that has created comment concerning "Houston's talking cars" is the use of illuminated signs. The passenger ready to board the car observes an illuminated sign that flashes on when the car approaches, reading "Enter at the Front." When about to stop, another illuminated sign in the interior lights up over the front vestibule, reading "Leave by the Rear."

Since each of the cars in the city service is operated by one man, these remodeled cars have been equipped with the treadle device that allows the passenger to open the rear door by stepping on the treadle when the car is stopped. The air valve operating this door engine is inoperative except when brakes are fully applied.

Upon leaving, a small sign flashes "We Thank You." This is mounted just above the exit opening. For the approaching motorist, a red light shines to the rear when brakes are applied, illuminating the word "Stop" in red. The switches operating these lights are operated by air pressure, when air is applied to the brake cylinder line.

All of these cars are single-enders, since it is unnecessary to reverse at the line termini. On account of our favorable weather conditions, the rear platform is open except for a screen protection around the outer edge.

Innovations and novelties are considered important elements in arousing interest in our service and creating a realization that the company is attempting to serve the public of this fast-growing city.



Close-Up of Front Sign Reading "Enter at Front." This, as Well as Interior Signs, Is Turned on by an Air-Operated Switch Attached to the Brake Line, so It Is Illuminated Only When Brakes Are Applied

Washing the Brooklyn Tunnels Prevents Delays from Electrical Trouble

BESIDES three bridges in New York City between Manhattan Borough and Brooklyn and Queens Boroughs, three under-river tunnels also are used by the trains of the New York Rapid Transit Corporation, the Brooklyn-Manhattan Transit Corporation's subsidiary. These tunnels are located at the Battery (Montague Street tunnel), Fourteenth Street and 60th Street in Manhattan. Each consists of two separate tubes made up of rings of cast iron in the under-river portions. The oldest of these tunnels, which is the Montague Street, has now been in service since 1920, or nearly six years.

Until recently the dirt which collected in the tunnels was removed by "dry cleaning" methods; that is, by hand labor. But the tubes kept getting dustier and dustier, not only because of dust blown in from the land sections but from brake shoe dust, due to the application of the brakes on the down grades.

While the conditions were not bad from a merely transportation standpoint, they were serious electrically. The dust settled on and around the third rail insulators and cables. When dampened by moisture from water leaking into the tunnel it made a strong, dense coating which was hard to remove. As it could not be wiped off with rags, wire brushes were required to get it off. On account of the large proportion of brake shoe dust, these coatings were electrical conductors, and it was therefore necessary to remove them frequently and if possible to prevent their formation.

While very little trouble was experienced from this dust during the first few years of operation through the tubes and there was no serious delay, yet minor delays were caused by it, and the cleaning of the third rail insulators and other third rail equipment became an expensive item of maintenance. The insulators were gone over every three months, generally requiring the services of two third rail gangs for three consecutive nights in each tube each time they were cleaned. As it was generally possible for the men to work in the tunnels only between the hours of 1 a.m. and 5 a.m., the progress was slow and the costs comparatively high, as the men had to be paid for the entire night's work. Furthermore, the dust was not being removed as fast as it accumulated and, with the lapse of time, it was becoming more and more troublesome.

In order to secure a more nearly complete removal of the dust and dirt the building division of the railway installed two 2-in. pipes, one in each tube, the entire length of the under-river section, a distance of approximately 1¼ miles. These pipes were connected to the city water mains at each end and were provided with valves and hose connections at intervals of 200 ft. The cleaning was done by two gangs of men, one gang working from each side of the river and meeting in the center. Although the water pressure varied considerably at different points in the tunnels and under different conditions, it was found to average about 85 lb. With that pressure there was no trouble in washing down the roof, sides and bottom of the tunnel, the water after use flowing along a gutter in the center of the track to drains, from which it was pumped out into the river.

In the cleaning of each tube about 800,000 gal. of water was used and it took six nights for the gang to go through. But when the work had been completed there was a marked improvement in the appearance and conditions of the tubes. More than 125 bbl. of dirt was collected and carried out in addition to much that had remained in suspension in the water and had been pumped out. It was found that very little water had got into the lighting conduits or fixtures and only a few of the latter had to be replaced on account of the cleaning.

Tri-City Trainmen Sign After Reading Bulletins

UNTIL recently it was found almost impossible by the Tri-City Railway of Iowa to impress upon trainmen the importance of looking at the bulletin board for new bulletins before taking out their runs. Equally difficult was the task of seeing that they signed the report after having read the bulletin. A register sheet of the type shown in an accompanying illustration has solved both problems. When a new bulletin is

TRI-CITY RAILWAY COMPANY
OPERATOR'S REGISTER SHEET
Date_____

LINE	RUN NO.	CAR NO.	HAVE READ BULLETIN NO.	REGULAR	EXTRAS	OUT	IN	TOTAL
BRIDGE LINE	1		267					
	2		267					
	3		267					
	4		267					

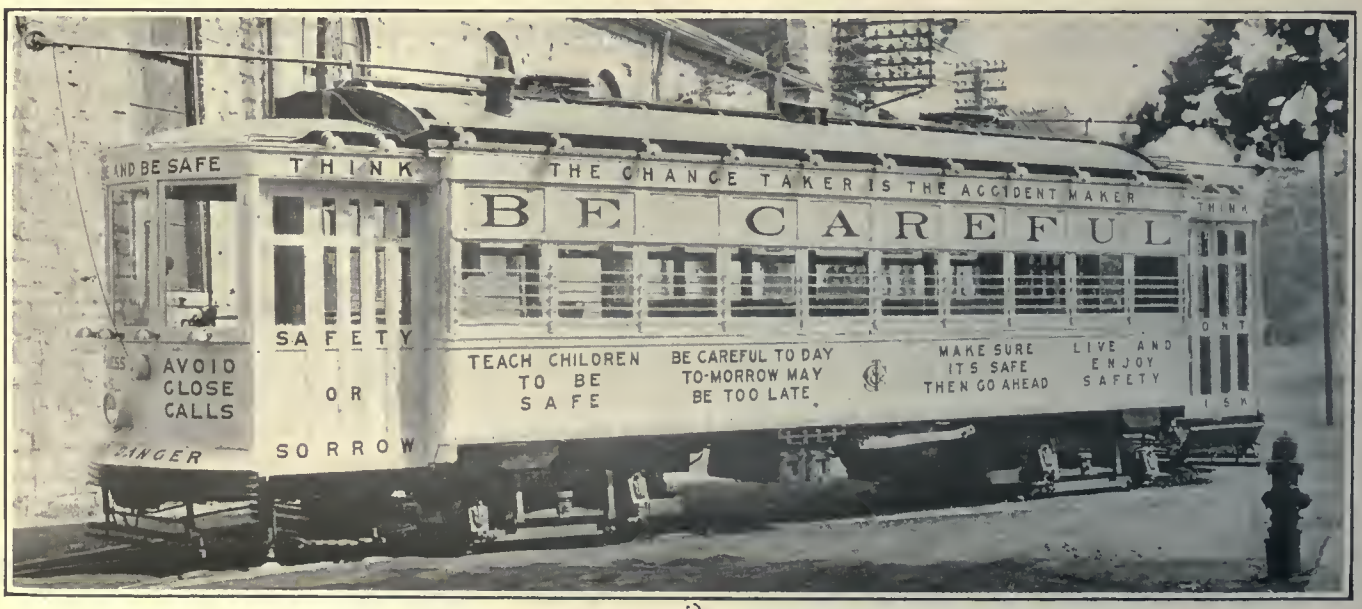
Trainmen Must Sign This Sheet to Show They Have Read the Latest Bulletin

posted the number of it is stamped opposite each run number on the sheet; when the trainman registers, his attention is called to the bulletin. It has been found that the bulletins are always read now. Trainmen must sign as having read it before they receive their pay. This column of the register sheet is left blank only when no new bulletins have been issued.

Railway Aids Safety Drive at Joliet

DURING the safety week held at Joliet, Ill., May 23 to May 29, the Chicago & Joliet Electric Railway co-operated by repainting one of its city cars and using it for the display of appropriate slogans. The background color was old ivory, while the lettering on the dashers, sides, etc., was black. This car was operated in regular service on various lines in the city and attracted much attention.

Police records show that only four persons were injured in Joliet during the several days of the campaign, which was considered a good showing.



A Traveling Advocate in the Cause of Safety Operated by the Chicago & Joliet Electric Railway

One Owner's Faith in the Trolley

FIRST ARTICLE

After Others Lost Hope, C. A. Smith Made "Stream Line" Interurban Successful—Straighter Track, Higher Speed, Greater Safety and More Attractive Cars Have Helped Bring About the Improvement



A scene along the "Stream Line" Interurban. This shows the type of construction and the Jones substation.

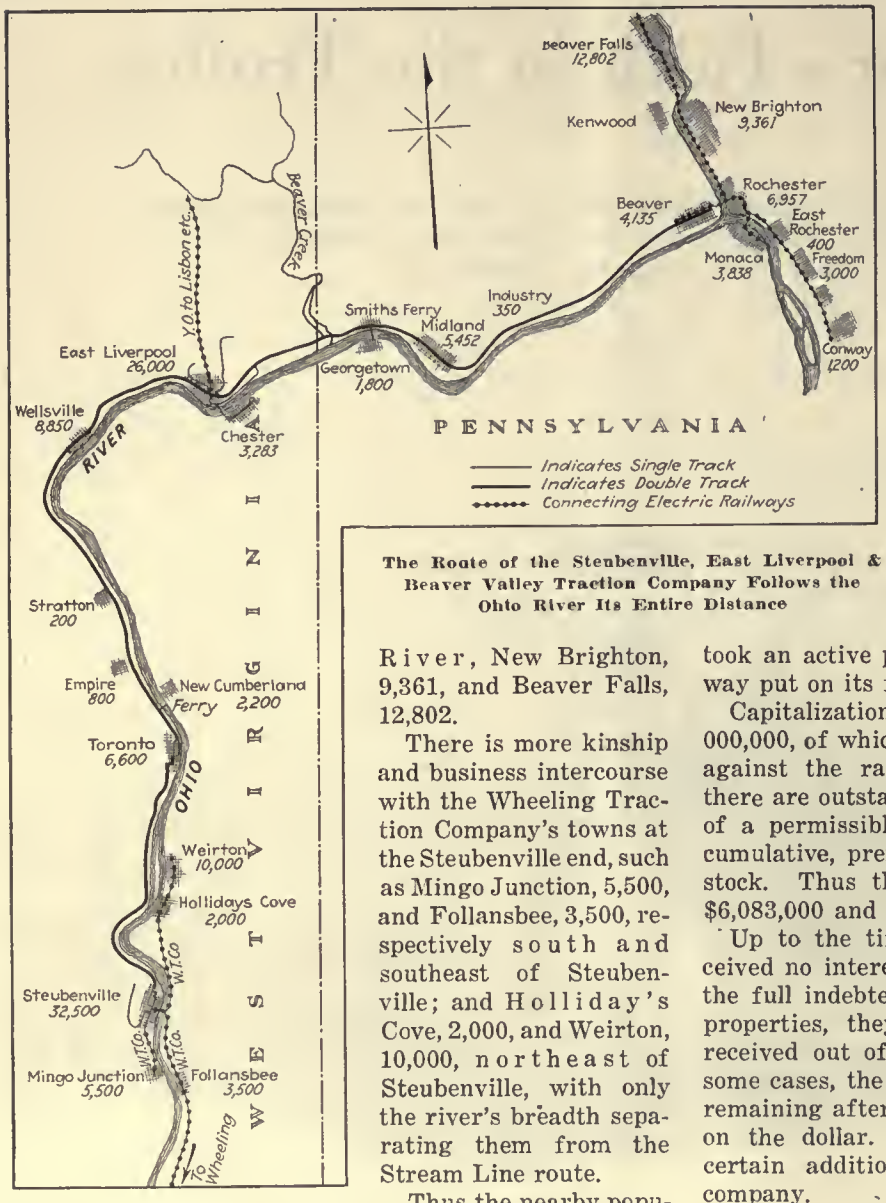
FURTHER proof that the electric railway is out of date only when it stands still or slides backward is found in the story of the rejuvenation of the Steubenville, East Liverpool & Beaver Valley Traction Company. For all its impressive length of title, the railway's interurban trunk line itself is of that shortness which has been declared hopeless in the face of automobile and motor-bus competition. Indeed, the property is but 43 miles long, between Beaver, Pa., and Steubenville, Ohio. Of this route, 2.5 miles between Vanport and Beaver forms a part of the Beaver Valley Traction Company, which operates city service over the joint section.

In addition to the interurban, city service is given in East Liverpool, Chester, W. Va. (opposite East Liverpool), Steubenville and, since Jan. 10, 1926, within Toronto on the main-line track. Other local services along the main line are given from Midland, Pa., as far as Wellsville, Ohio. The territory served, particularly around East Liverpool and Chester, is noted as the greatest tile and pottery district of America; but steel and tinplate mills, as well as coal mines, are also large employers of labor in this area.

One fortunate feature of the road itself is that it was built as a double-track interurban from the start. Of its 40 miles or so of directly-owned trunk line, less than 2 miles is single track. With the various route changes of recent years completed, the company will also be in the happy position of having 72 per cent of its interurban route on private right-of-way. Attainment of this proportion under the topographical conditions existing is a real achievement. The route follows the Ohio River very closely through a land full of steep bluffs that often come almost to the water's edge. Therefore, changes in route are not made so readily as on flat terrain. Even as it is, the railway is compelled to follow the one and only through highway for several miles through the longitudinal communities served.

Finally, before entering on the account of this railway's griefs and apparent salvation, it is well to summarize the population to secure some idea of the business opportunities. The number of inhabitants in each community is presented in an accompanying table.

It will be seen from the table that the population served along or near the company's lines exceeds 96,000. Adjacent to the Beaver terminus are a number of small communities which are not closely related to the activities between Beaver and Steubenville, such as: Rochester, 6,957; East Rochester, 400; Monaca, 3,838; Freedom, 3,000; Conway, 1,200; and up the Beaver



The Route of the Steubenville, East Liverpool & Beaver Valley Traction Company Follows the Ohio River Its Entire Distance

River, New Brighton, 9,361, and Beaver Falls, 12,802.

There is more kinship and business intercourse with the Wheeling Traction Company's towns at the Steubenville end, such as Mingo Junction, 5,500, and Follansbee, 3,500, respectively south and southeast of Steubenville; and Holliday's Cove, 2,000, and Weirton, 10,000, northeast of Steubenville, with only the river's breadth separating them from the Stream Line route.

Thus the nearby population of the Beaver Valley Traction Company's system totals 37,558 and of the Wheeling Traction communities 21,000—a total of 58,558 within likely commuting distance for jobs in this territory.

Troubles Began Before the World War

Up to the year 1911 the territory was served by three non-competitive railways, from Vanport to the Pennsylvania-Ohio state line; from the state line to the west end of Wellsville, Ohio; and from Wellsville to Steubenville, including local lines. In this year the railway and lighting properties of these three concerns were leased by J. G. White & Company under the corporate title of Tri-State Railway & Electric Company, a company formed to operate the lines.

The combination did not prove successful, bond interest of these three companies being defaulted on Nov. 1, 1912, and a formal receivership declared in March, 1913. The bondholders of the three companies instituted actions to secure cancellation of their leases, but operation of the property as a unit was continued except for the group of lines at East Liverpool, in which a local man, C. A. Smith, had acquired an interest.

The more active participation of Mr. Smith in the traction problem was due in large measure to his extensive property interests in the territory. He was not new to public utilities, having once held a substantial interest in the East Liverpool gas property, but he had turned to other activities. When he entered the railway field in the depression that was coincident with the opening of the war, he had no illusions about making money from that source. He did believe, however, that reliable transportation had to be given if his investments and those of his neighbors were to grow and prosper.

The first step was to merge the three railways. This was achieved by Nov. 1, 1917. In carrying out the merger two important changes were made: First, the light and power portions were sold, and, second, the capitalization was scaled down, partly to allow for the simplified conditions and partly to reduce the overhead charges per mile. In this reorganization Mr. Smith took an active part, as he was anxious to see the railway put on its feet as quickly as possible.

Capitalization of the original companies totaled $14,000,000, of which $9,000,000 to $10,000,000 was charged against the railway portion. In the reorganization, there are outstanding $1,483,000 bonds at 5 per cent out of a permissible $3,000,000; $2,600,000 in 5 per cent cumulative, preferred stock; and $2,000,000 in common stock. Thus the present actual capitalization is only $6,083,000 and the authorized capitalization $7,600,000.

Up to the time of the merger, the bondholders received no interest. As these bondholders had assumed the full indebtedness of the original light and railway properties, they were assigned whatever sums were received out of the sale of the lighting business. In some cases, the pro rata distribution of the cash assets remaining after liabilities amounted to but 7 or 8 cents on the dollar. However, these bondholders received certain additional values in securities of the new company.

This liquidation was not completed until about November, 1925. In the meantime the bondholders had run into other misfortunes. The merger company began well enough by paying interest regularly. This continued until May 1, 1922, but as higher expenses had come much faster than approval of higher fares, there was no reserve to meet the calamity of a 51 weeks strike.

Parenthetically, it may be recorded here that the same spirit of enterprise and loyalty to public interest shown by the management is reflected today in the rank and file—"the ride salesman."

POPULATION OF TOWNS SERVED BY THE STEUBENVILLE, EAST LIVERPOOL & BEAVER VALLEY TRACTION COMPANY

Beaver, Pa.	4,135
Through riders from steam railroad and Beaver Valley connections, as well as local riders to industries along the interurban	
Industry, Pa.	350
Midland, Pa.	5,452
Smith's Ferry, Ohio, and George Town, Pa., combined	1,800
East Liverpool, Ohio, and suburbs	30,000
Connections with Youngstown & Ohio River Railroad interurban	
Chester, W. Va.	3,283
Opposite East Liverpool	
Wellsville, Ohio	8,850
Stratton, Ohio	200
Empire, Ohio	800
New Cumberland, W. Va.	2,200
Opposite Calumet, Ohio	
Toronto, Ohio	6,600
Steubenville, Ohio	32,500
Total served directly or by ferry	96,170

Resumption of bond interest was out of the question in the year or two following the reopening of the railway. Too much had to be done to make up for deferred maintenance and to meet the new menace of the ubiquitous automobile on rapidly improving highways. Bond interest assignments were far from adequate for the purpose, so C. A. Smith, the lone optimist among the owners, began to lend his personal credit to the rehabilitation program.

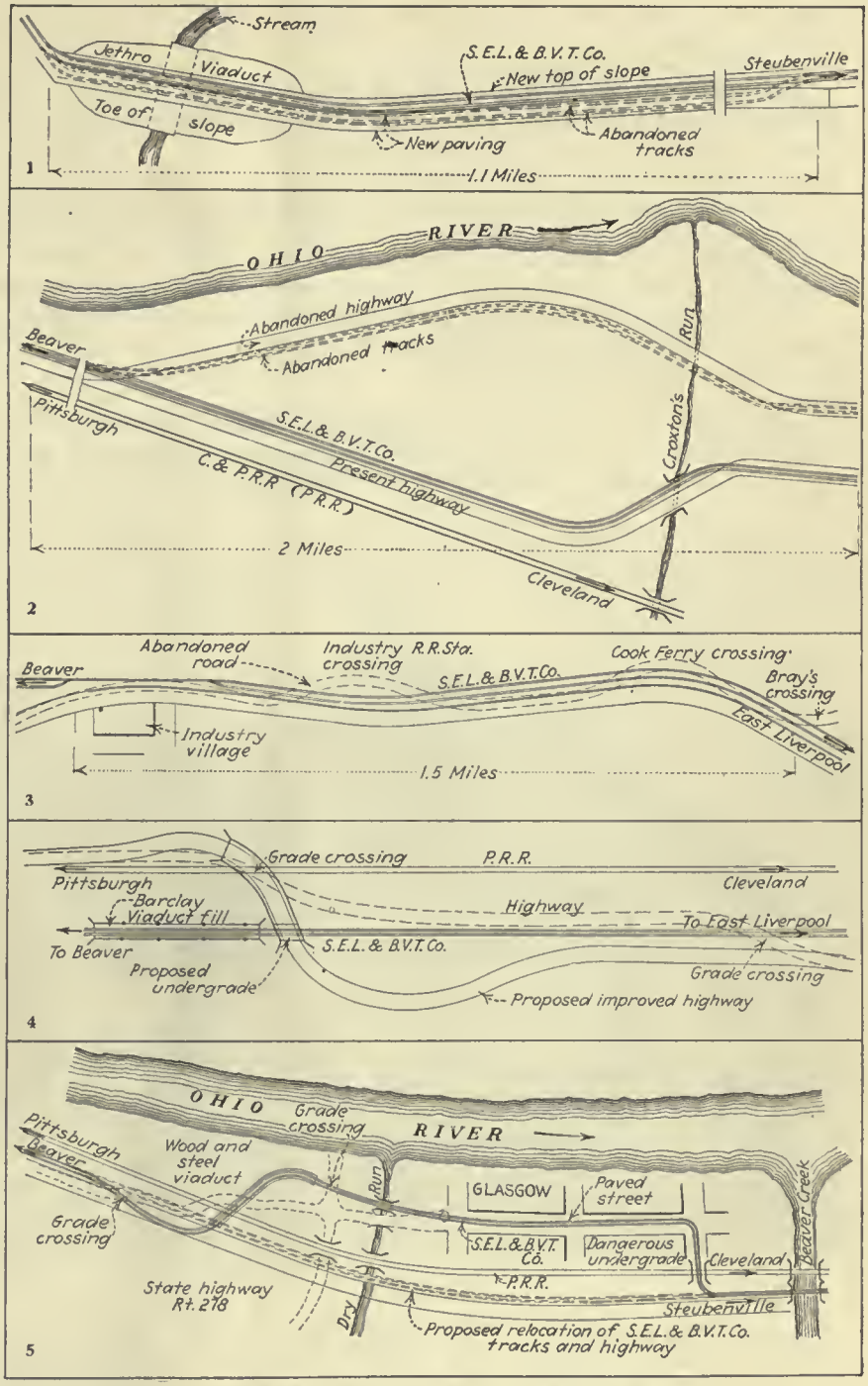
Thus it came about that by January, 1925, Mr. Smith was in a position to buy out enough partners in the enterprise to give him a major interest in the three forms of securities. From that time on the work of improvement was so accelerated that by last September he could say: "Now that I've got a good railway, I'd better get me someone to capitalize on these betterments in an operating way." Thereupon, he invited Garry S. Wills, then general manager of the neighboring Wheeling Traction Company, to manage the property with the title of general superintendent. While Mr. Smith retains the title of general manager, he plans to give most of his time to the direction of his other extensive interests.

A Quarter Million for Straighter, Safer, Faster Track

From the first, Mr. Smith's idea has been to get away from the expense of operating over paved streets or over viaducts when private rights-of-way constructed by cuts and fills can be made to pay better through lower upkeep, higher speed, more attractive service and fewer accidents through collisions.

So as early as 1921 the line was straightened at Jethro by leaving the highway for 1.1 miles and running over a fill instead of a viaduct. In 1923, 3 miles of paved highway between Jeddo (just south of Toronto) and King's Crossing was exchanged for private right-of-way. In 1923-1924, 2 miles of highway was left between Calumet and Myers Lane, adjacent to Jeddo. The paving charges here were met by arrangement with the Ohio River Edison Company, which had purchased land along the river, thereby causing transfer of the railway to a new and straighter right-of-way farther from the bank.

In 1924-1925, 1.5 miles of highway at Cook's Ferry was left. A trestle at Barclay, near Industry, was superseded by a fill. In 1925-1926, more than 1.5 miles of route east of Smith's Ferry was taken in hand. In this section, one viaduct, one trestle over-crossing and one under-crossing are being removed and 8,000 ft. of track altogether taken off of the highway.



Some Examples of Relocation Along the Line

1. Along West Eighth Street, East Liverpool, the tracks have been taken off the highway.
2. At Calumet both highway and tracks have been straightened.
3. Between Industry and Bray's Crossing several railroad crossings were eliminated.
4. At Barclay a viaduct and fill have permitted straightening of the line.
5. The proposed relocation at Smith's Ferry will improve operation greatly.

During 1926 about 1.4 miles of route will be taken off of the highway in the second zone out of Steubenville, viz., between Stop 7 and Castner's, thereby eliminating three highway crossings. Because of this change, the upkeep of about 1 mile of paving from Crawford Avenue, Steubenville, to Castner's (in Jefferson County) will be eliminated. The greater part of the improvements described will be found pictured in the accompanying group of five drawings.

To summarize: About 11.5 miles or approximately 25 per cent of the interurban route has been or is being improved at a cost of $250,000. The net result will be

a permanent reduction in paving obligations and of the troubles incident to unattractive speeds and the presence of accident-breeding vehicles.

Looking at these betterments from the standpoint of possible competition from motor buses in interstate operation, this can be said: Only the trolley will be able to give high speed with safety because about three-quarters of its operation will be on private right-of-way, whereas the motor bus must stick to the public highway and jeopardize its patrons to give really fast service and adhere closely to a schedule.

By December, 1925, also, the company completed the rehabilitation of its La Belle View line in Steubenville. By spring, a 1,400-ft. loop extension will be finished to take in a fine, new housing area.

In all paved work, the company's standard construction is 93-lb. T-rail on a concrete foundation with brick or concrete surfacing. Tracks of the company are



The Offices and Carhouse Are Located in East Liverpool

standard gage, 4 ft. 8½ in., but a gauntlet rail is used between Vanport and Beaver because of the 5 ft. 2½ in. gage of the Beaver Valley Traction Company.

Improvements in Overhead, Signals, Etc.

On account of the many localities where corrosive smoke is prevalent, Copperweld strand wire has been adopted to replace ordinary steel strand span wire. The latter averaged a life of six months; Copperweld has already done better than two years in like situations. While the No. 00 trolley remains standard, it is being supplemented with additional feeders.

One of Mr. Wills' first moves to take advantage of the improved track and line conditions with maximum safety and for better speed was to install Nachod type CD automatic signals in place of those of the hand-throw variety. These signals are used not only on single-track sections, but also on double-track sections where they serve for car spacing. The single-track signals are intended to care for as many as fifteen cars in a block.

To the three Cheatham automatic track switches installed earlier two more have been added to speed up and simplify one-man car operation, and in one instance to eliminate two switchmen. Two of these switches are on local branch lines.

Telephone dispatching has been in use for twelve years past on the main line. Operators of local cars can secure instructions from the dispatcher by means of railway telephones in the downtown terminals, but they are also trained to make calls over the Bell system from any part of their runs.

Automatic Substations Produce Excellent Power Condition

Power had been purchased from the American Gas & Electric Company under a contract which was due for revision in 1922, but the matter was postponed until April, 1923, because of the strike. The railway was then served by four manually-operated substations owned by the power company and one automatic substation owned by the railway. As early as 1921 the Westinghouse Electric & Manufacturing Company had arranged with Mr. Smith for automatic operation of one of its two units at the Industry substation, the second remaining in reserve for manual operation. Eventually, the Westinghouse company secured a contract for the equipment of seven railway-owned automatic substations, the first of their kind with complete electro-pneumatic switching equipment. This important installation will be treated separately in a forthcoming issue. It need only be stated that the excellent voltage conditions now obtaining are also helping toward the goal of higher speed and brighter illumination of the cars.

Ample power is not inconsistent with safe and economical use thereof. It is of interest to note, therefore, that since August, 1925, Economy meters have been installed on all cars of the system and an energy saving campaign instigated.

Improved Training for Platform Men on Third Avenue System

Emphasis Is Laid on Methods of Instruction as Against Selective Work—Formation of Correct Habits Used as the Foundation of the Training School Effort—Apparatus in the Schoolroom Is of Simple but Effective Character

By Dr. Christian P. Segard
Assistant Secretary in Charge of Employee-Employer Relations, Third Avenue Railway System, New York City

CONDITIONS of the labor market must largely determine the procedure to be followed in the selection and training of platform employees. In New York City there never are enough applicants for this class of work to allow of the selection of only the highest grade men. While out of every hundred men who apply only 70 are accepted, perhaps only 50 are considered of a high grade. Hence the efforts of the employment department must be devoted more along the lines of training than of selection. Many of the men are fresh from the old country. Not only are they unfamiliar with street car operation, but have little knowledge of our busy civic life and conditions as well. For such men from five days to two or three weeks additional training is often necessary.

Basically, the philosophy back of the training methods of the Third Avenue Railway System is a study of the behavior of the applicants and the formation in them of correct habits. There are three primary behaviors in human nature: (1) manual; (2) verbal; and (3) visceral. The first is of basic importance to the position of motorman and the second of lesser importance. For conductors, the second, behavior, is of major importance and the first is of minor value. Visceral behavior is of course beyond our control and while important can only be observed and noted.

Formation of correct habits is considered a matter of prime importance and the first duty of the training school. Good training performs a service to the men and the company as well. It reflects itself in the attitude of the men toward the public and makes for a higher quality of street car service. A careful motorman (or conductor) may reasonably be said to be one who has relatively few accidents. A good conductor is one who performs his required duties with minimum friction with the public.



Six of the Bank of Nine Dummy Controllers Used in the Training School of the Third Avenue Railway System, New York. The Different Controller and Brake Types Used on the Property Are Set Up in the School

Knowledge that the condition of the applicant, mental as well as physical, meets the specifications of the job is the first essential. The training school's minimum requirement for admission is as important as any school examination. Shortage of men is the only reason for lowering the standard of acceptance. This involves far more intensive training methods and follow-up checks to be certain that no unfit men are retained in the service.

The instructors should, as a matter of course, be men who know operating conditions. But it is just as important that they have the ability to impart that knowledge to others. The theory that a good player makes a good coach is not always true. A stumbling block over which instructors sometimes fall is that the lecture or demonstration becomes an old story. They must realize that it is a new story to each student. Another

stumbling block is when road instructors and school instructors teach differently. For example—if four steps are necessary to perform a certain act and these are taught in the school in the order of first, second, third and fourth, then the same procedure must be followed by the road instructors. A habit can never be formed correctly by making changes in method during the process of its formation.

For the training school a well-planned and carefully-arranged course in theory and practice is of great importance and it should be detailed on paper so that everything is included that is useful. By this means repetitions are prevented, unavoidable changes in instructors, as due to sickness, do not cause loss of time or knowledge to students, and new ideas can be inserted in the text when it is found desirable.

The text of the instruction course used on the Third Avenue System is divided into two parts, those for conductors and motormen. Each of these is again divided into theory and practice. The amount of time allotted to each subject is prescribed, with the number of days and hours that an experienced or an inexperienced man is allowed to "break in" on each line of the division to which he is assigned. Curriculum schedules used are shown herewith.

The equipment of the school consists of four sep-

Abstract of Curriculum of Training School for Motormen and Conductors Used on the Third Avenue System, New York City

This definite program makes the work uniform and avoids changes or omissions due to a change of instructors

Student Conductors' Curriculum

Days—Tuesday and Thursday.		**Time**—8:15 a.m. to 1:00 p.m.	
Purpose	Fifteen minutes.	One period.	
Courtesy	Fifteen minutes.	One period.	
Miscellaneous Rules	Thirty minutes.	One period.	
Collecting and Registering Fares	Thirty minutes.	One period.	Theory.
Fare Boxes and Registers	Fifteen minutes.	One period.	
	Theory—five minutes.	Practice—ten minutes.	
Day Card	One hour.	One period.	
Transfers	Fifteen minutes.	One period.	
Free Riders	Five minutes.	One period.	
Accidents	Thirty minutes.	One period.	Theory.
Hand Brakes and Circuit Breakers	Twenty minutes.	One period.	
	Theory—ten minutes.	Practice—ten minutes.	
Car Equipment	Ten minutes.	One period.	Theory.
Stopping Car At Rear End	Five minutes.	One period.	Theory.
Hand Plow	Ten minutes.	One period.	
	Theory—five minutes.	Practice—ten minutes.	
Double-Throw Switch	Five minutes.	One period.	
Opening and Closing Doors	Five minutes.	One period.	

Approximately 60 hours actual work on a car on the lines of his division with a qualified instructor.

The topics discussed under the above headings are outlined in the attached supplement.

SUPPLEMENT TO STUDENT CONDUCTORS' CURRICULUM—TOPICS

Purpose—Knowledge of the rules.

Courtesy—The idea of selling the service by being polite at all times. Being agreeable, helpful, kind and considerate to all passengers. Seating passengers—cripples and infirm.

Miscellaneous Rules—Obedience; reporting for duty; uniform; bulletin board; personal appearance and habits; assignment of wages; time pieces; waiting at intersections; stopping places; making announcements; requesting passengers to move forward and leave by front door; transferring passengers from disabled car; conversation; lost property; bulky and objectionable packages; delivering newspapers; peddling and begging; smoking on cars; spitting; ventilation; passing obstructions; bell signals; route and destination signs; advertising signs; trimming cars; backing cars; pushing stalled cars; conductor's position on car; delays; keeping car clean; extinguishing lights.

Collecting and Registering Fares—Passenger must drop fare in box, and registered at that time. Conductor not allowed to drop fare in box for passenger. Making change: what to do when too much money is dropped in box; what to do when unable to make change. Three dollars in change when starting out and warning always to count and know exactly how much he has when starting out: what to do when over in money at end of day's work; children under four. Cash tickets. What to do when passenger refuses to pay for a child four years or over. Turning in receipts.

Day Card—How it should be filled out. Student making out a sample card.

Fare Boxes and Register—How they work, and what they register. How to ring up fares: proper setting of trip indicator; what totalizers mean; bunching fares; examining seal on box. Compare fare box and register reading with reading on record card. What to do when fare box or register is out of order. When register is reading wrong.

Transfers—Proper method of punching; punching twice; not punching; when to issue; proper returns; void transfers and what to do; wetting fingers and holding transfers in mouth. Emergency tickets. What to do when short.

Free Riders—Who they are—police, firemen, pass holders, mail carriers.

Accidents—Definition; different type; information; witnesses; business address; opening up line; emergency phone call; calling ambulance; notifying report clerk, starter, inspector; contributory negligence; the report; ejectments.

Hand Brakes and Circuit Breakers—How to use a hand brake. How to set and trip circuit breakers; their use.

Car Equipment—The trolley pole; plow; trolley catcher; dash; headlight; bumper; drawhead and drawbar; wheel guards.

Stopping Car At Rear End—How to cut power off from rear end—by opening door, tripping circuit breaker or by pulling down trolley pole, and putting on hand brake.

Hand Plow—What it is—its use and how to use it. How it should be connected to controller, ground plugs, or double-throw switch, with warning to trip front and rear circuit breakers when connecting hand plow leads to controller or ground plugs. How to connect hand plow to channel rail.

Double-Throw Switch—What it is, and where it is on the car. How to throw it and when. Warning never to throw same unless door is open.

Opening and Closing Doors—How to operate them. Warning not to open until car has stopped; to look out before closing, see if everyone is clear of step, never close door in passenger's face; getting handle back all the way so that step is down flat. Warning not to push with left hand on the glass; seeing that safety catch is over foot pedal on rear exit door.

Student Motormen's Curriculum

Days—Monday and Wednesday		**Time**—8:15 a.m. to 12:00 n. 1:30 p.m. to 4:30 p.m.	
Purpose	Ten minutes.	One period.	
Hand Plow	Twenty minutes.	One period.	
	Theory—ten minutes.	Practice—ten minutes.	
Door Sheet	Fifteen minutes.	One period.	
	Theory—five minutes.	Practice—ten minutes.	
Controller	Two hours.	One period.	
	Theory—one hour.	Practice—one hour.	
Hand Brakes	One hour.	One period.	
	Theory—thirty minutes.	Practice—thirty minutes.	
Double-Throw Switch	Ten minutes.	One period.	
	Theory—five minutes.	Practice—five minutes.	
Bell Signals	One hour.	One period.	
	Theory—thirty minutes.	Practice—thirty minutes.	
Car Equipment	Thirty minutes.	One period.	Theory.
Regenerative Emergency Stop	Thirty minutes.	One period.	
	Theory—fifteen minutes.	Practice—fifteen minutes.	
Emergency Stop	Thirty minutes.	One period.	
	Theory—fifteen minutes.	Practice—fifteen minutes.	
Circuit Breakers	Twenty minutes.	One period.	
	Theory—ten minutes.	Practice—ten minutes.	

SUPPLEMENT TO STUDENT MOTORMEN'S CURRICULUM—TOPICS

Purpose—Knowledge of car mechanism.

Hand Plow—What it is—its use and how to use it. How it should be connected to controller, ground plugs, or double-throw switch, with warning to trip front and rear circuit breakers when connecting hand plow leads to controller or ground plugs. How to connect hand plow to channel rail.

Door Sheet—What it is. When and how to sign up cars.

Controller—Definition. How to feed it. Type, points, difference between running and resistance points? Saving power.

Hand Brakes—How to use a hand brake.

Double-Throw Switch—What it is and where it is on the car. How to throw it and when. Warning never to throw same unless door is open and car at a standstill.

Bell Signals—What 1, 2, 3 and 4 bells mean and what to do.

Car Equipment—The trolley pole; plow; trolley catcher; dash; headlight; bumper; drawhead; drawbar; wheel guards; trucks; driving wheel; pony wheel; emergency door switch; sand bin; sand boxes.

Regenerative Emergency Stop—How to stop car without brakes and power off the line when going forward and when sliding backward.

Emergency Stop—Using power to stop car—not taking the time to trip circuit breaker but simply pulling reverse lever and throwing controller handle all the way around to the second running position.

Circuit Breakers—How to set and trip them; their use; where they are on the car.

arate and distinct units, all in the same room. A group of students using any one of the four units does not interfere with the use of another unit by a different group. The four units are:

One 42-ft. street car complete in operating condition but with wheels blocked up so that it does not move when the equipment is operated.

One platform having installed on it the entire mechanical and electrical car equipment in operating condition so that the working of each unit may be studied separately.

One platform with one-man car equipment installed.

One unit consisting of nine sets of dummy motorman's equipment. These sets can all be used at once or separately.

Before a student motorman is sent out on the road to break in he is given instruction on all four units. The standing car gives him the "feel" of being in charge of a car and being in the driver's position. The equipment is shown to him in operating condition and he sees what happens to the machinery with each action that he will perform. The dummy controller and brakes are used to give the man experience in feeding the controller, setting up hand and air brakes and in general to make him familiar with the knack of handling the control apparatus. Each movement is at first done at the instructor's command and its result explained. After considerable instruction of this nature the applicant then goes out for road instruction on equipment in service, but in charge of student trainers, who are motormen that have qualified for this work.

When the student motorman reports back to the school he is again put at the dummy controller and the degree of his improvement noted. Here is where the kind of road instruction that he received shows itself and gives a recheck both on the instructing motorman and on the division instructor who supervised the work. In this case the dummy equipment is invaluable.

Happenings that require the motorman to be on the alert may be classified in two groups. The first comprises events of a normal character that require habitually more than ordinary caution to guard against accidents. The second includes conditions that require instant response on the part of motorman in order to prevent an accident. The "Fire Stop" is an example of the first group, and an automobile cutting short in front of a moving trolley illustrates the second.

Each one of these likely situations is summed up in a brief statement of two to six words. Each statement is painted on a piece of frosted glass and fitted into grooves in a series of five boxes which are mounted at a distance ahead of the bank of dummy controllers. While each of the statements can be seen by the operators, each box is equipped with two electric lights so that any one can be illuminated as a signal to respond to that particular event. The control of this illumination by the operator who is instructing the class is invisible and consists of five knife switches that can be operated without any visible manual effort, so that the event cannot be anticipated by the students being tested.

When the "breaking in" period is half through the first or cautionary group of events is given. The students are lined up in front of the nine controllers and are instructed to make the proper response by movement of controller and brake handle when the signal is flashed on. Much practice is given with this equipment and considerable evidence is gained in regard to the progress the students are making. At the end of the "break-in" period, the second or emergency group of signals are given. Again, the students gain practice and the instructor is able to judge what improvement the student has made. With nine controllers any number from one up to nine may be instructed at the same time.

Since installing this device the company is assured of one important thing, every man knows how to make a regenerative emergency stop with his eyes shut. It is a habit. He has done it so often that he knows how.

The device has helped us in many other ways. We formerly thought we knew who were the poorest motormen in the school group. Now we know. And while our judgment was pretty good and we still use it, the device verifies and assists it. We also find that the students come to the school ahead of time in order to practice with this equipment. Furthermore, we can shift from one situation to any other situation immediately. This cannot be done with the motion picture method, since it is always the same and the events happen in the same sequence.

Some of our older men have tried it and have voiced their approval. It acts as a check on habits. It is a



These Sets of Signs Face the Bank of Nine Motorman Positions

Immediately facing the bank of dummy controllers is a set of signs suggesting ordinary conditions that may happen. These may be illuminated individually. They are used during the early training. These signs represent emergency conditions and are used by students after they have had actual experience under the supervision of a student trainer. Note the use of the three lower signs, common on many properties but seldom explained in training schools.

good thing to replace a bad habit with a useful one even though the old bad one is not easily shaken off. It can be done, and we are optimistic in this belief.

Each piece of equipment used by the motormen and conductors is reproduced in the training school and its use or meaning explained.

As to the conductor, his main job is handling people. If they were all one kind it would be easy. But this is not the case, so we are trying to train him into a realization of this fact. Can we get him into the habit of being courteous to all? I not only think so, but know so. We can in the training school give him a lesson in loading his car, being courteous and in not arguing with passengers. The most difficult job in the world is handling all kinds of people and handling them right. And the conductor can be taught the habit of courtesy.

Today I can point to a number of our platform men who, when I meet them on the car or at the office, tell me of how tactfully and courteously they met certain situations—and they were proud of it. The hardest job in the world becomes the easiest through courtesy, kindness and tact. And some of our platform men see it. Many times they get the worst of the bargain. Passengers forget themselves and are difficult to handle. The emotional bumps from words sometimes cause more damage than physical bruises and cuts. The greatest and most effective piece of public relations work that I know of is secured by courtesy and tact on the part of the uniformed employee. And it can be made a habit on his part by the training school.

Naturally, the proof of the pudding is in the eating. We feel sure that a better class of men is being turned out and that fewer accidents result. With the results showing only on the new men on the system and the pending accident cases extending back over months or even years, it is too early to claim tangible results in dollars and cents. Another year or two and results along these lines are sure to follow. Today we notice improvement in accident records and a great reduction in the number of complaints. That can be attributed to the work of the training school.

As often is the case in real accomplishment, the credit for success lies in co-operation. The improvement in personnel work here shows the close harmony of thought and action on the part of members of the transportation department and the personnel of the training school.

A Whole Convention Moved by Interurban

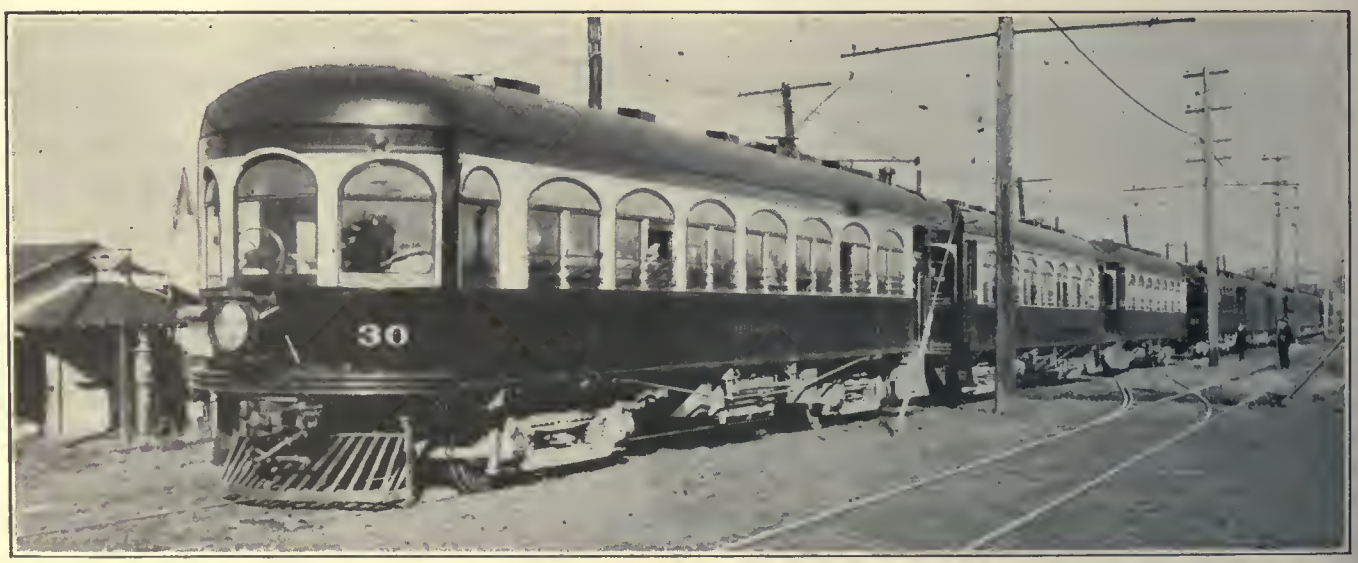
By A. J. Rowe
Northern Texas Traction Company, Fort Worth, Tex.

IT BECAME known to the Northern Texas Traction Company in June, 1925, that the Coca Cola Bottlers' convention was to be held in Dallas in March, 1926, coincident with the Southwestern Exposition, Fat Stock Show and Rodeo to be held in Fort Worth. This situation appealed to the commercial instinct of the Northern Texas officials, and after considerable negotiation with the Atlanta office of the Coca Cola Bottlers' Association, the Baker Hotel in Dallas and the Rodeo officials in Fort Worth, the company was successful in getting the contract to move the entire convention, consisting of 450 delegates, from Dallas to Fort Worth and back again the same day. After this was decided, the Fort Worth Coca Cola Bottlers decided that it would be a good plan to entertain the convention at the Fort Worth plant with an elaborate barbecue. This necessitated not only handling the crowd by special interurban cars from Dallas to Fort Worth, but on special city cars in the city of Fort Worth.

The movement was made at the lowest rate for round-trip service that the company could offer. The actual transportation required eleven interurban cars operated in three-car trains and one two-car train. In Fort Worth transfer was made to eleven city cars on a street where there was little other traffic. The transfer from interurban to city cars was made in ten minutes. The party then moved to the barbecue and from there to the Coliseum in North Fort Worth. After the Rodeo entertainment the interurban cars were waiting for the delegates and they were transported back to the Baker Hotel in Dallas without change.

Every transportation man will know the extensive details that have to be worked out in advance and the precision of performance necessary. This movement was further complicated by the heavier traffic during the week of the Southwestern Exposition.

The company was complimented in several written and oral comments regarding the manner in which the convention was handled in the 80-mile round trip from Dallas to Fort Worth.



An Entire Convention of 450 Coca Cola Bottlers in Transit Between Dallas and Fort Worth, Requiring Eleven Cars on the Northern Texas Traction Company Lines

Improvement Made in Rolling Stock of British Tramways

More than Six Hundred and Seventy New Cars Included in Recent Orders—Much Reconstruction Has Been Done to Promote Passenger Comfort—Modernization of Motors Has Resulted in Greater Speed



New Car of the West Ham Corporation Tramways Is One of a Comparatively Small Number of Double-Truck Vehicles Included in Recent British Orders. At the Left Is the End View of This Car, Showing Collision Bumper That Is Backed Up by Strong Spiral Springs

REPLACEMENT of obsolete rolling stock has made rapid progress in Great Britain since the early part of last year, the proportion of new tramway cars ordered to the total number owned being considerably greater than in the United States during the same period. New buses also have been bought in large numbers by the tramways, but the extensive improvements made in the rail equipment reflect clearly the conviction of the managements that the latter will continue to be the principal means of mass transportation.

Recent orders for new cars for the tramways alone, not including the rapid transit lines, total 679, or more than half the number of new street and interurban railway passenger cars purchased here in 1925. This ratio is particularly impressive when operations in the two countries are compared. In England some 250 "undertakings," as they are called, operate about 14,500 cars on 4,400 miles of track. In the United States some 750 companies operate 80,000 cars on 46,000 miles of track. Thus the per cent of replacement of rolling stock on British tramways was more than twice that which occurred here.



Seats and Backs on the Upper Deck of the West Ham Car Are Spring-Cushioned and Attractively Upholstered

Several hundred rapid transit cars have been ordered recently by the London Underground system, and similar purchases have been made also in the United States. In the present article, however, attention will be confined to purchases of new rolling stock for the tramways.

In October, 1925, the largest purchase of new cars for British tramways in several years was made by the Leeds City Council. Many people urged buying buses to replace some of the rail lines rather than more cars, but the municipal authorities decided, after a thorough investigation of all phases of the problem, that best results would be obtained by adding to the tramway rolling stock. Accordingly, 200 new cars were authorized, 150 to be built by manufacturers and 50 to be built in the tramway shops.

When these 200 cars are placed in operation in the near future a substantial









improvement will be made in transportation facilities. Leeds Corporation Tramways has approximately 117 miles of track and serves a population of about 560,000. The average number of cars in daily service is 255. The new equipment will be used in part to replace older rolling stock, and in part to give increased service.

All cars included in this purchase will be of the single-truck, double-deck type. The trucks have been so designed that the car will be able to negotiate a 29-ft. radius curve. Special care has been taken to reduce galloping motion and side oscillation to a minimum. Leather upholstered seats are provided for 72 passengers, 26 on the lower deck and 46 on the inclosed upper deck. Over-all length is 31 ft. 2 in. Teak is used for the lower part of the body, with pine and ash for the upper part. Motors are of 50 hp. capacity.

Another large order placed about the same time as that for Leeds includes 50 new cars for the Sheffield Corporation Tramways. The population served by this system is about the same as at Leeds, but the trackage is less by 83 miles, while 325 cars are used in daily operation. The new cars are of the single-truck, double-deck, top-covered type, but are slightly larger than those at Leeds, the over-all length being 32 ft. 6 in. Peckham pendulum trucks with an effective spring-base of 20 ft. are used. Motors are Metropolitan-Vickers light weight, 50 hp. rating. A great improvement from the standpoint of appearance has been made by the use of curved glass in the vestibule windows on both upper and lower decks.

Rearrangement of the seats on the upper deck has made them more roomy, but reduced the seating capacity from 48 to 40. Instead of having narrow cross-seats for two passengers on either side of the aisle, as has been the practice in the past, the new cars have a double seat, 38 in. wide, on one side and a single seat, 21 in. wide, on the opposite side of the aisle. On the lower deck seats are provided for 28 passengers, making the total capacity 68.

Last fall the Aberdeen (Scotland) Corporation Tramways put in service ten single-truck, double-deck, top-covered cars. These have a seating capacity of 64; 24 in the lower saloon and 40 in the upper. Protection for the motorman is provided by an inclosed vestibule. This practice is not yet very common in Great Britain, but such protection is particularly desirable at Aberdeen, the most northerly tramway town on the island, where the winter climate is frequently extremely rigorous. The upper half of the center vestibule window is hinged, as shown in an accompanying illustration.

Altogether 24 municipal tramway undertakings and one private company are included in the list of those which recently have bought new cars. Almost all of these are of the double-deck type, exceptions being one experimental car at Bradford, which is described in greater detail in this article, an experimental car at Glasgow, one at Halifax equipped with worm drive, and the new one-man car of the York Corporation Tramways. The single-truck type predominates to a marked

Inclosed Upper Decks Are Standard at Sheffield and London

1. Appearance of the new Sheffield cars is improved by the use of curved glass in both upper and lower vestibule windows.
2. This arrangement of seats on the upper deck of Sheffield cars has made them more roomy but has reduced the capacity from 48 to 40.
3. Standard double-truck car of the London United Tramways Company which has been re-equipped with modern motors.
4. Installation of upholstered seats in the cars of the London United Tramways is a recent innovation.

extent in recent car orders, although there have been a number of important double-truck designs built recently. Among the latter are the cars for Birmingham, Blackpool, Bournemouth, Bradford, Cardiff, Darwen, Manchester, Plymouth, Walthamstow and West Ham. Additional details are given in an accompanying table.

Double-Truck Cars for West Ham

Last fall the Town Council of West Ham, a borough on the eastern boundary of London, placed in operation six new cars of a much improved type. This borough being adjacent to the metropolis, the general design of these new cars naturally is similar to the London County Council standard double-truck, double-deck, top-covered car. The seating capacity is 78, 32 on the lower deck and 46 on the upper. In view of the high speed of operation on this property a particularly low center of gravity has been incorporated in the design. The under frame is of heavy steel and is equipped with collision fenders backed up by spiral springs. Seats on both upper and lower decks are attractively upholstered.

An interesting new car was recently brought out by the Plymouth Corporation Tramways. Although the new vehicle is of the double-truck type and seats 70 passengers as compared with 54 in the older single-truck cars, the weight has been reduced 2,500 lb. Over-all length is 32 ft. 8 in. and the total weight approximately 24,000 lb. Motive power is supplied by two 45-hp. motors of British Thomson-Houston type. The car is remarkable for its quiet operation.

Completely inclosed vestibules are a feature of this car. The open top deck has been adhered to, partly because of the mild climate at Plymouth and partly because the track gage is only 3 ft. 6 in., and there are many sharp curves and steep grades. Under these circumstances it was desired to keep the center of gravity as low as possible. Each upper seat has two waterproof aprons, one to cover the seat itself and the other for the protection of the passenger's legs. These aprons are fastened to the seats with a spring arrangement, which causes them to return automatically to their housings when released. On account of the narrow gage longitudinal seats are used on the lower deck. An innovation, however, has been made by equipping the car with pneumatic seat cushions on both upper and lower decks. Another novel feature is that the exterior of the body is not painted but is simply varnished so that the grain of the wood is clearly brought out. This type of car is to be the future standard for the Plymouth Corporation Tramways.

The Manchester Corporation Tramways has ordered 110 double-truck cars with inclosed upper decks.

London Cars Speeded Up by Modern Motors

The London County Council Tramways, the largest undertaking in the United Kingdom, serving an estimated population of about 4,500,000 with more than 2,000 cars on 325 miles of track, has recently taken two



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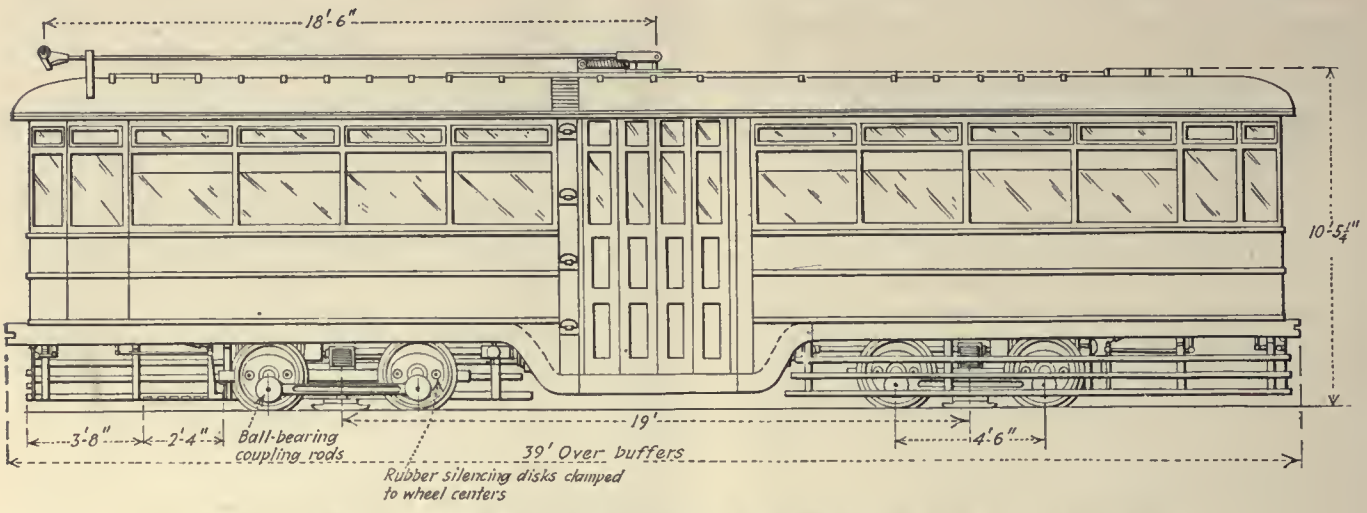

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Plymouth and Aberdeen Show Effect of Climate on Car Design

5. Completely inclosed platforms are a feature of the new car of the Plymouth Corporation tramways. The exterior is not painted but is varnished to bring out the grain of the wood..
6. An open upper deck is provided in the Plymouth car because of the usually mild climate.
7. Narrow-gage track in Plymouth makes it necessary to use longitudinal seats downstairs. These are equipped with pneumatic cushions.
8. New car of the Aberdeen Corporation Tramways has been designed to afford the motorman protection from the inclement weather of that northern Scottish town.



Bradford Corporation Tramways Has Departed from British Precedent in the Design of a Single-Deck, Double-Truck, Center-Door Car, as Shown Here

important steps to improve its service. These consisted of equipping the cars with more powerful motors, and providing cushioned seats instead of wood-slat seats on the lower deck. The former improvement has now been practically completed, and the average speed of cars has been increased to 9½ m.p.h. This is the highest in the country, and is about 1 m.p.h. higher than the average speed of the buses of the London General Omnibus Company. This has been accomplished even though the buses stop less frequently than do the cars because their passenger carrying capacity is considerably smaller.

Installation of cushion seats has been carried out to only a limited extent so far. If they prove advantageous on the lower deck, however, it is likely that they will be installed also on the upper decks of cars. Such a move would be entirely feasible as all of these cars have covered upper decks. Recently the London General Omnibus Company received permission to place roof covers over the upper decks of its vehicles. Probably this will lead to the use of cushion seats and the tramcars will have to follow suit, although their smoother roadbed makes this less of a necessity than it is on the buses.

Similar improvements have been made on the cars of the London United Tramways, Ltd., the Metropolitan and South Metropolitan systems. These undertakings are subsidiaries of the London Underground system and are somewhat smaller than the London County Council Tramways. Some 40 cars have been fitted with new Metropolitan-Vickers motors, and 70 equipped with the latest type of magnetic brakes. A much higher rate of acceleration has been obtained, as well as increased speed on hills. The new motors have ball or roller bearings on the armature shaft, and weigh only 39 lb. per horse-power, as compared with 81 lb. per horsepower in the case of the older motors. Improved gears and pinions have done much to reduce noise of operation.

Passenger comfort has been promoted by the substitution of cross-seats for longitudinal seats on both the upper and lower decks. These have spring cushions, and are attractively upholstered in moquette, as shown in an accompanying illustration. Lighting and other interior fittings have been greatly improved. Favorable comment received as a result of these changes has resulted in a decision, on the part of the management, to equip additional cars in the same manner.

RECENT ROLLING STOCK ORDERS

Tramway	No. of Cars	Type	Seating Capacity
Aberdeen Corp.	20	Single-truck, double-deck, covered	64
Birmingham Corp.	80	Double-truck, double-deck, covered	63
Blackpool Corp.	12	6 Double-truck, double-deck, covered	78
		6 Double-truck, toast-rack	64
Bolton Corp.	3	Single-truck, double-deck, covered	56
Bournemouth Corp.	20	Double-truck, double-deck, open	66
Bradford Corp.	1	Double-truck, single-deck, center door	56
Cardiff Corp.	85	55 Single-truck, double-deck, covered	64
		30 Double-truck, single-deck	54
Coventry Corp.	5	Single-truck, double-deck, covered	55
Darwen Corp.	2	Double-truck, double-deck, covered	72
Derby Corp.	6	Single-truck, double-deck, covered	52
Edinburgh Corp.	12	Single-truck, double-deck, covered	60
Exeter Corp.	7	Single-truck, double-deck, open	54
Glasgow Corp.	1	Single-truck, single-deck	36
Halifax Corp.	3	1 Double-truck, double-deck	64
		1 Single-truck, single-deck, worm drive	36
		1 Single-deck, standard gear drive	36
Lanarkshire Tramways	12	Single-truck, double-deck, covered	66
Leeds Corp.	200	Single-truck, double-deck, covered	72
Manchester Corp.	110	Double-truck, double-deck, covered	80
Nelson Corp.	3	Single-truck, double-deck, covered	55
Oldham Corp.	12	Single-truck, double-deck, covered	64
Plymouth Corp.	3	Double-truck, double-deck, open	70
Preston Corp.	1	Single-truck, double-deck	60
Sheffield Corp.	50	Single-truck, double-deck, covered	68
Walthamstow Council	12	Double-truck, double-deck, covered	71
West Ham Corp.	7	Double-truck, double-deck, covered	78
	1	Single-truck, double-deck, covered	60
	*10	Double-truck, double-deck, covered	69
York Corp.	1	Single-truck, single-deck, one-man	24
Total	679		

*Tenders have been invited for these ten cars, but orders have not yet been placed.

RADICAL INNOVATION AT BRADFORD

Departing altogether from established British precedent, the Bradford Corporation Tramways has designed a single-deck, double-truck, center-entrance car. The principal features of this design are shown in an accompanying illustration. In many respects the new car resembles center-door cars used in the United States. It differs from the most recent designs followed in this country, however, in that no end doors are provided and passengers must use the center doors for both entrance and exit.

The motors are spring-suspended under the center of the car body. A propeller shaft and worm gearing arrangement drives the outer axle of each truck. Wheels are connected by side coupling rods. Hand braking is accomplished by means of drums on the inside axles, while the track brake is operated by air. It is expected by the management at Bradford that this type car will prove speedier in operation than the type heretofore used.

The Readers' Forum

Restrictions in Zion Not Illegal

THE CITY OF ZION
Lake County, Illinois

ZION, ILL., June 15, 1926.

To the Editor:

Your issue of June 12, Vol. 67, No. 24, carries the following article:

Commission Over-rules City's Bus Ordinance

An attempt to interfere with the state regulation of public utilities by the city of Zion, Ill., when it issued an order on March 29 prohibiting buses of the Chicago, North Shore & Milwaukee Railroad from stopping for passengers within its corporate limits on Sundays, was recently overruled by the Illinois Commerce Commission. That body decided that the charter granted to the utility by the state denies the right of a municipality to pass ordinances or take other measures to alter features of service as set forth therein. In response to the protests of more than 400 inconvenienced Zionites, the North Shore line appealed to the commission on May 18 for authority to renew the Sunday service. It was then that the commission issued its over-ruling order. Accordingly, an attempt was made by the company to restore bus service on the original schedule. The driver of the first bus to stop within the city limits was arrested, however. Pending a promised action against the company by city officials, Sunday service in Zion has again been suspended.

As a consistent reader of your publication and representing the city of Zion in this matter, I cannot allow to pass unchallenged this erroneous and unfair statement. The statutes of the state of Illinois concede certain rights and duties to cities and villages in the matter of streets. It is the position of this city that no buses may operate within a municipality without prior consent of the municipality. The Illinois Commerce Commission recognized this fact in the North Shore certificate case No. 12498 when it said: "Of a certainty, any order of this commission must be construed in relation to the local power and authority of any municipality involved."

The commission gave the North Shore company a limited certificate in 1922 to operate "through" the city of Zion—it did not and could not, in the absence of permission first had and obtained from the city of Zion, authorize the bus company to operate "in" the city of Zion. Later the city of Zion by franchise and resolution granted the bus company restricted permission to operate in the city. Still later, i.e., some months ago, the Council directed by appropriate resolution that the buses should not stop in the city on Sundays. This was due to the religious nature of the city and the general desire of the citizenry to keep that day in accordance with our faith. The North Shore readily consented to this restriction—there was only a very limited Sunday patronage.

About six weeks later, due to political influences in our county, the bus company was cited to appear before the commission and "show cause why it does not observe its schedules." The North Shore did not appeal to the commission for authority to renew the Sunday service—your statement to that effect is in error. The relations between the city of Zion and the North Shore company are most cordial. No 400 citizens have been inconvenienced nor protested. There were, it is true, a few names signed to a petition, but practically none of them ever used the bus and many signatures represented young children.

There has been no attempt made by the city to interfere with state regulation as authorized by law; we do contend, however, it is the city's right under our statutes to say when and where the buses may and shall stop on public streets. There is much legal support for this view; I may add this issue is now pending before our Supreme Court in an action brought by the city of Chicago against the Chicago Motor Bus Company.

I should appreciate the courtesy if you will print this letter, to offset the incorrect and unfair statement which appeared in your June 12 issue.

A. E. HUENERYAGER,
Commerce Counsel.

A Good Selling Job on a Single Page Circular

SELLING a freight service on the theory of "express service at freight rates" is appreciated by many interurban lines in the Middle West. The Illinois Traction System has recently issued a one-page circular as illustrated. In this the prospective shipper is shown



One-Page Advertisement of Freight Service Offered by Illinois Traction System

at a glance the possibilities of routing merchandise to and from the many steam roads intersected by this 556-mile system of interurban lines. Names and addresses of the traction representatives at all important points are included.

Interurbans in the central West are well situated to provide a real service in the rapid distribution of commodities.

Maintenance Notes

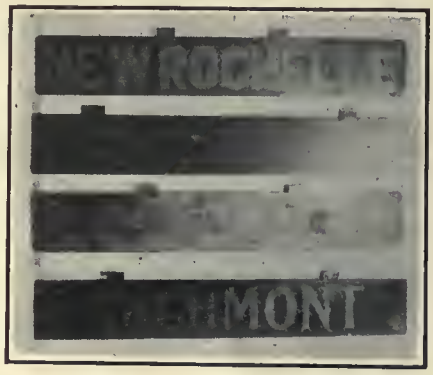
Spray-Painted Signs Produce Economies

WHEN the New York, Westchester & Boston Railway opened its extension from Larchmont to Mamaroneck, New York, a large number of destination signs were required. It was desired to produce these quickly, and as economically as possible, and also to perfect methods so that they could be maintained cheaply. Several methods were tried and a spray-painting method using lead stencils was finally found to give best results by J. T. Hamilton, master mechanic of the railway.

Preliminary tests of different methods showed that the spray method using lacquer paint was most economical. Difficulty was experienced, however, in regard to the stencils. Several different materials for these were tried, including brass, steel and paper. Trouble was experienced in keeping the stencils tightly against the sign to be lettered. If any of the edges of the stencil at the letters were raised slightly from the sign a wavy and blurred edge was produced which required considerable time of the painter to touch up.



Lead Stencils with Loose Parts Held in Place by Wires Raised from the Surface



In Relettering Decalcomania Signs the Old Paint Is Removed and a Black Body Color Is Sprayed Over the Old Lettering. An Old Sign Is Shown at the Bottom, Next Above Is the Sign with Paint Removed, Next Is Sign with Body Coat Applied, and Finished Sign Is at Top

Also as several of the letters required supports for the center opening and loose parts, a form of stencil with flat supporting sections made it necessary to hand paint out several lines in the finished sign. These problems were finally solved by using a lead stencil, $\frac{1}{8}$ in. thick, and by supporting the loose sections by brass wires, which were raised up from the surface of the lead so that the spraying would not be interfered with. To bring the edges of the stencil at the letters into good contact with the sign the lead is pressed down by the workman as the letters are sprayed. Accompanying illustrations show the construction of the stencils and also examples of signs done by this process.

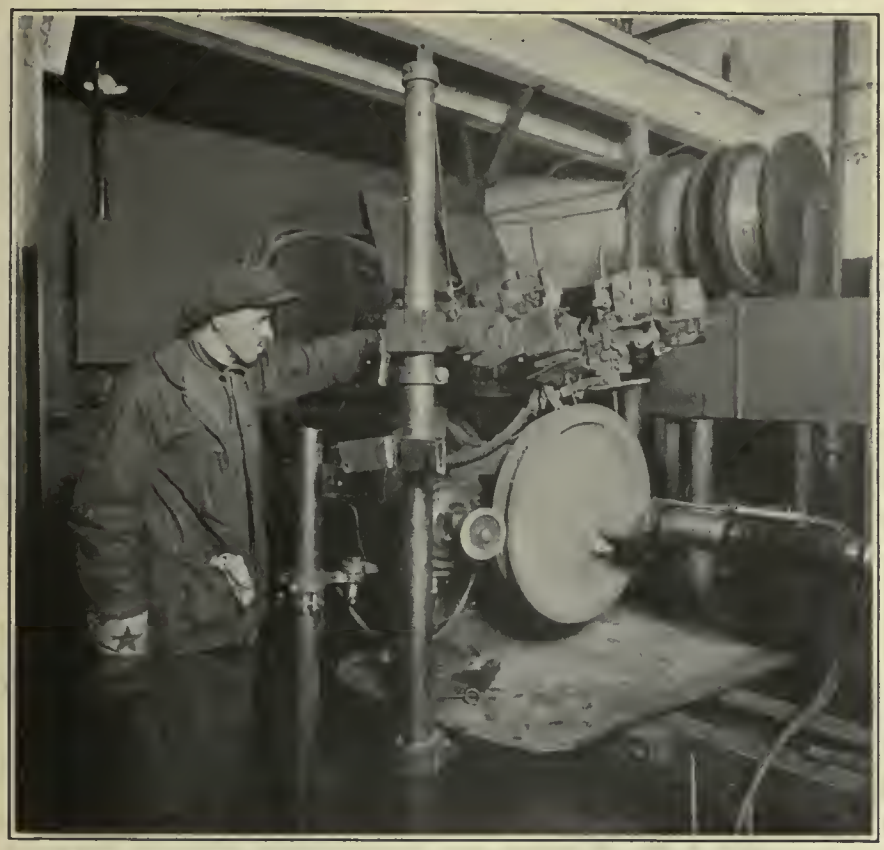
The signs are lettered on $\frac{1}{16}$-in. spring steel plates. In order to provide distinguishing marks when the signs are placed in a rack, and also for convenience in locating the stencil accurately, lugs are arc welded to the sheet steel. These extend out from the main body of the sign. The material used for painting consists of a ground color in Japan. The surface of the sign is first sprayed with a black color, then the letters are sprayed on, using chrome yellow,



Spray Painting a Sign in the Shops of the Railway



Attractive Appearance Results with the Signs in Position



A Motor-Driven Wire Brush Mounted so as to Provide for Convenient Adjustment Cleans the Flanges of Wheels Preparatory to Welding

and uncolored lacquer is applied over all as a final coat. A Paasche type of air gun is used for all of the spraying operations.

In experimenting regarding best methods of cleaning up the edges where these become blurred, it was found that gasoline rubbed lightly along the edge will remove the last layer of paint applied without damaging the surface of the undercoat. This saves time also as the painter does not need to retouch the edges of the letters with a brush and paint.

In the maintenance of signs lettered with the lacquer paint process no attempt is made to remove the material, but the sign is cleaned thoroughly with steel wool and then a body of black is sprayed over the letters and the same method of lettering is then used as for new signs. In relettering decalcomania signs which were previously used all of the old paint is removed.

Wire Brush Cleans Ahead of Weld

FLANGES of rolled steel wheels used by the Department of Street Railways, Detroit, Mich., are built up by automatic electric welding. To provide a clean surface for the layer of metal which is deposited, a motor-driven circular wire brush has recently been added to the welding equipment. The methods employed for building up the flanges of wheels by means of a double-head welder were discussed in ELECTRIC RAILWAY JOURNAL, issues for Jan. 17, 1925, and March 21, 1925.

The circular wire brush used for cleaning ahead of the point where the welding takes place is mounted on an extension of the shaft of a ¼-hp. motor. The motor in turn is mounted on a bracket with a hinged adjustment. The supporting bracket is clamped to an upright pipe of 2 in. diameter. Vertical adjustment of the brush is obtained by moving the clamp up or down on the supporting pipe. Sidewise and in-and-out adjustment is made by the swiveling action of the supporting bracket, which in addition to having a hinge connection in the center also turns about the upright pipe support.

Cleaning of the flange ahead of the welding has proved of particular advantage for this work, as much more satisfactory welding is obtained without danger of the welded metal scaling off. Some steel wheels, instead of wearing to a sharp flange which requires building up, wear to a thick flange with a square back. In order to bring these flanges back to a standard contour, an oxyacetylene burner is mounted on the bracket for the wire brush motor. The backs of the flanges are then cut to the desired shape by this outfit.

Bolt Rack in Overhauling Section

SUPPLIES of bolts and nuts most used in truck overhauling by the Grand Rapids Railway, Grand Rapids, Mich., are carried in a rack

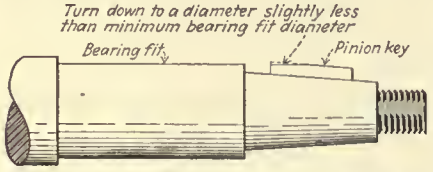


A Rack for Keeping Bolts Handy to Truck Overhauling Work Has Been Found Useful in the Shops of the Grand Rapids Railway

provided in its truck overhauling section of the shop. This rack has 42 small compartments each labeled with the particular size of bolts which is kept therein. Truck overhauling workmen can thus be sure of getting a bolt of the proper size and can obtain this quickly without the necessity of going to the storeroom each time one is required. An accompanying illustration shows the rack in place in the shop.

Pinion Keys Made Permanent with Shafts

TO RENEW pinion end armature bearings it is necessary to remove the pinion, and in many cases the keys for the pinion also must be removed in order to get the armature bearing off. A few removals of the key from its keyway will destroy proper fit, and a loose keyway results in breakage of the pinion and destruction of the armature itself, which often costs several hundred dollars to repair with new materials and keeps equipment from service.



Pinion Keys for Armatures of the West Penn Railway Are Rusted to the Shaft and the Top Edge Is Turned Down to a Diameter that Will Permit the Pinion End Armature Bearing to Pass Over

This problem has been effectively solved by Daniel Durie, superintendent of equipment for the West Penn Railways, Connellsville, Pa. Pinion keys on the armatures of this company's railway motors are made permanent with the armature shaft by rusting them into position. When a key is installed it is dipped in salammoniac water, and by allowing the shaft to stand for a few days rusting takes place so that the key is anchored solidly in position. In order to provide clearance, so that the pinion end armature bearings will pass over the top of the key, armature shafts are placed in a lathe and the tops of the keys are turned off to a diameter slightly less than the minimum diameter to which the pinion end bearing fits are allowed to reach as a minimum. After the pinion keys are once in position and turned down to proper dimensions, they need not be removed and so there is no danger of loose keys.



Ruled Board and Straight Edge Used by Beaver Valley Traction Company in Cutting Window Glass

Board Aids Glass Cutting

EASE in the cutting of glass has been obtained by the Beaver Valley Traction Company, New Brighton, Pa., with a cutting board specially designed for this work. It is ruled laterally and longitudinally at intervals of 1 in. and a straight edge, operating in guides at either side of the board, is used to mark the panes of glass for cutting. A particular feature of this straight edge is the ratchet arrangement provided at top and bottom so that fractional adjustments from side to side may be made, thus giving any desired measurement.

New Equipment Available

All-Copper Rail Bond

HEAVY copper terminal sleeves to hold securely the cable in a tight strip are features of a new rail bond being placed on the market by the Electric Railway Improvement Company, Cleveland, Ohio. This is an all-copper bond, and no molds, dams, or other special devices are required to install it on the rail when using the manufacturers' special coated pure copper arc-welding rod. The sheath and cable are forged to a thin flat section, which is sheared at an acute angle. The surface exposed to welding is therefore of greater area than the cross-section of the cable. Due to the thin flat welding face, a smaller amount of applied welding metal will give a rail contact of maximum area.

Improved Riveter

IMPORTANT improvements have been incorporated recently in the construction of Thor pneumatic riveters, made by the Independent Pneumatic Tool Company, Chicago, Ill. The handle is not subject to bending cracks, being drop forged with a heavy section at the bend. All portholes are drilled full and clear and spiral inlet ports to the throttle valve allow easy regulation.

A positive ratchet lock is provided between the barrel and handle, the octagonal milling on the sliding collar giving a large bearing surface to hold the collar rigid. The odd number of ratchet teeth combined with the even number of sides in the octagon give eight positions for perfect mesh on each ratchet tooth.

The main valve is a hollow sleeve of heavy section with no portholes. The lower end of the valve bore is ground tapered and larger than the bore in the barrels, preventing the piston from striking the valve.



New Type Rail Bond Applied to Rail by Means of Copper Welding Rod

American Association News

Traffic Congestion

ATTENDING a meeting of the committee on traffic congestion held at Toledo, Ohio, June 4, were Messrs. Miller and Schorn, of Detroit, originators of the Miller-Schorn rapid transit plan, who outlined the plan as proposed for that city. Mr. Miller stated that he expected to see it in operation within twelve months. Considerable discussion followed his talk, but the committee took no definite action. R. W. Emerson presented an analysis of the report of the Hoover conference on highway safety, and explained how the sub-committee studying this subject had reached its conclusions.

Additional items to bring the model traffic ordinance up to date were suggested by A. J. Fink, as follows:

1. Vehicles coming out of alleys, garages, or any private property or driveway shall come to a full stop, sounding horn immediately before crossing sidewalk into the street.

2. In the congested district in any traffic restricted area, or on any main artery, no gasoline, oil, tire service or air shall be served on the roadway, but only from within the private property.

3. Parking shall be prohibited within 25 ft. of any exit for fire apparatus or other emergency equipment, also along the corresponding portion of curb on the opposite side of the street.

4. Parking shall be prohibited at street crossings within 20 ft. of the intersection of the curb lines, or within a distance so as not to interfere with the turning of street cars.

5. Parking shall be prohibited at any taxicab stand, hack stand, freight trucking stand or bus stop, except for the vehicles for which these stands have been set aside.

6. Parking shall be prohibited on main street car arteries on which heavy automobile traffic passes through.

7. Parking shall be prohibited along main car line throats in the congested district from 7 o'clock a.m., and on others from 8 a.m. to 9:30 o'clock a.m., and from 4 o'clock p.m. to 6:30 o'clock p.m.

8. Parking shall be prohibited within 50 ft. of a grammar or high school or playground property, or in the corresponding section of the curb on the opposite side of any such street, between the hours of 8 o'clock a.m. to 8 o'clock p.m.

9. No loading or unloading rubbish, ashes, garbage, coal, building materials, barrels or kegs within the congested area between 8 o'clock a.m. and 9:30 o'clock a.m. or between 4 o'clock p.m. and 6 o'clock p.m.

10. In the congested district in any traffic restricted area, or on any main artery between the hours of 8 o'clock a.m. to 6 o'clock p.m., no vehicle shall load or unload except parallel to the curb, at a place where written request has been made to the city official and a temporary written permit has been issued. Where and when end or angle loading is permitted, the vehicle shall remain backed to the curb only long enough to be expeditiously loaded or unloaded, and every precaution shall be taken to restrict traffic as little as possible.

11. On any street where parking is permitted during the hours when the parking limit applies, there shall be set aside upon approval of written request to the city officials a space designated as a loading zone in which passenger vehicles may stand for not over ten minutes, and in which vehicles shall stand only long enough expeditiously to load or unload merchandise.

12. No large girders, steam shovel or large tractor shall be moved during the daytime if it affects the movement of traffic; in such event it shall be done at night. In all cases a written permit of the city officials governing the route it shall take to get to its destination shall be required.

13. No manhole shall be opened up on busy thoroughfares without a permit, and in some cases manholes shall be permitted to be opened only during off-peak hours.

14. Vehicles shall make no lefthand turns in the delivery district during peak hours, wherever possible.

15. Traffic officers shall divert vehicular traffic when necessary in order to avoid congestion or to promote safety and convenience, and no person having charge of a vehicle shall refuse or neglect to obey the direction of a traffic officer.

16. Any police or traffic officer shall cause to be impounded any vehicle left without an operator that interferes with the general regulation of traffic, and the owner or operator thereof can only repossess himself of such vehicle by first paying any and all towing and storage charges resulting from such violation.

After discussion, it was recommended that these new items be included in the committee report.

Synchronized and co-ordinated traffic signals were considered. It was the consensus of opinion that co-ordinated lights of the general type used in Chicago were desirable, and it is planned to include such a recommendation in the report.

Investigation being made to determine the means of transportation used by customers patronizing department stores in congested districts has not been fruitful of results. J. A. Greig stated that Cleveland and Chicago were the only cities where checks of this kind have been attempted. In Cleveland, Mr. Emerson said that a three-day check has been made. C. H. Evenson brought out the fact that in Chicago $50,000 has been appropriated for traffic surveys. Information obtained from these investigations is to be included in the final report of the committee.

COMING MEETINGS OF *Electric Railway and Allied Associations*

June 28-July 2 — Central Electric Railway Association, summer meeting, S. S. South American, Buffalo, N. Y., to Chicago, Ill.

July 8-10—Midwest Electric Railway Association, annual convention, Brown Palace Hotel, Denver, Colo.

July 22—New England Street Railway Club, annual outing, Portland, Me.

July 23-24—Central Electric Railway Accountants' Association, meeting, Drake Hotel, Chicago, Ill.

August 12-13 — Wisconsin Public Utility Association, Railway Section, La Crosse, Wis.

Oct. 4-8—American Electric Railway Association, annual convention and exhibits, Public Auditorium, Cleveland, Ohio.

October 25-29—Annual Congress and Exhibit—National Safety Council —Detroit, Michigan.

Accident Prevention

MEMBERS of the joint committee on accident prevention of the Claims and Transportation & Traffic Association will recommend at the convention in October: (1) safety education of the public and school children; (2) co-operation with all local accident bodies; (3) indorsement of the so-called Hoover plan. They will further recommend that the work of the committee be made continuous. This was decided in New York on June 4. At that meeting the members present went over the answers to a questionnaire on accident prevention work which was sent out some time ago. Answers received to this questionnaire represented 60 per cent of the companies doing outstanding work. In the report of the committee the high lights of the answers will be picked out, and the names of the companies which replied to the questionnaire will be presented. The answers in detail will not be given. The idea is to recommend or call attention to methods employed by other companies. It was agreed that one of the best means toward progress in accident prevention was by lining up the association behind the Hoover plan. This contemplates efforts to secure general acceptance of the model Hoover law so modified as to meet any purely local needs. This would be a great step toward uniformity. Members were urged to turn in their advanced report comments by July 1. Among those who attended the meeting were A. W. Koehler, Milwaukee; R. R. Hadsell, Rochester; E. J. Paige, Baltimore; G. B. Powell, Louisville; A. G. Jack, Wilmington; Seth Baldwin, New Haven; T. E. Lawrence, Brooklyn; M. W. Bridges, Chicago, chairman for the T. & T. Association, and H. K. Bennett, Providence, chairman for the Claims Association.

Merchandising Transportation

FINAL consideration of the report of the merchandising transportation committee of the Transportation & Traffic Association was given at the last meeting of the year held in Cleveland on June 22. Drafts of practically all sections of the report had previously been read and passed on.

Only the final revisions and discussions of the last sections of the report remained.

Members present were: R. W. Emerson, H. L. Brown, E. A. Palmer, A. C. Spurr, S. E. Emmons, J. D. Donley, C. D. Smith and R. N. Graham, chairman.

New England Outing Planned

PORTLAND, Me., will be the meeting place of the New England Street Railway Club's annual outing, which will be held on July 22.

The News of the Industry

Commission Won't Oppose Local Council

The Public Service Commission in the matter of the application of the United Traction Company, Albany, N. Y., for an increase in its fares from 7 to 10 cents decided that it had not jurisdiction to enforce increased fare in the cities of Troy and Rensselaer in opposition to the terms of local franchises. The action of the commission is viewed by officials in the cities affected as opening the way back to the original 5-cent fares in Troy and Rensselaer. The commission's action also serves to advance the demands of Albany city officials that in requesting a fare increase the traction company should not seek to make Albany pay deficits incurred in other cities of the Capitol district.

John E. MacLean, counsel for the United Traction Company, said that the decision would be appealed. This probably means that the entire matter of increased fares for the United Traction Company will be taken out of the hands of the Public Service Commission and determined in the courts.

Use of Chicago's Idle Traction Funds Sought

Two resolutions seeking to compel the Chicago Surface Lines to invest its damage claims reserve fund in good bonds and to use its depreciation and renewal fund for the construction of at least 60 miles of new track and the purchase of 350 additional cars, were presented to the local transportation committee of the City Council on June 17 by Alderman C. F. Nelson.

The author of the resolutions declared that the company's damage claims fund, which now amounts to nearly $6,000,000, is in the banks and drawing only 3 per cent interest. He proposes to have the fund placed in the custody of a board of trustees, composed of representatives of both the city and the company, who will invest as much of the sum as is not required for the settlement of damage claims in bonds yielding a higher rate of interest.

More than $16,000,000, which has accumulated in the company's renewal fund since the unification ordinance of 1911, should be expended for better transportation facilities before the franchise expires next February, the Alderman urged. Although track construction and additional equipment do not legally constitute renewals and replacements, he believes that a precedent for such a proposal was set when the 100 new cars recently ordered by the company were paid for out of this fund. Invested in these much needed facilities, he added, the fund will earn 8.25 per cent instead of only 3 per cent.

Pursuant to Alderman Nelson's suggestion, Corporation Counsel Busch was instructed to confer with surface lines immediately and to draw up a petition to the Illinois Commerce Commission asking authority for such expenditures.

The failure of surface lines officials to appear before the committee was explained by the Alderman as being due to their interest in receivership. They want to control the first mortgage bonds and, therefore, the companies, by a receivership for three or perhaps five years, he said. Their attitude of indifference, however, is not regarded by the committee as a bar to further progress. The latter has threatened to complete the franchise draft without the companies' co-operation if it is found to be necessary. Mr. Leonard Busby, president of the Chicago City Railway, is the only traction executive who has so far agreed to discuss the problem with the committee.

Intensive Advertising Drive

Milwaukee Company, Through Newspaper Medium and Employees' Talks, Informs Public of Purpose of One-Man Car Service—Uniformity of Appearance Meets with Public Approval

IN CONNECTION with the recent installation and operation of one-man cars on its Walnut Street line, the Milwaukee Electric Railway & Light Company, Milwaukee, Wis., has launched an intensive advertising campaign in all Milwaukee newspapers to acquaint the public step by step with what the company is trying to accomplish as well as what the new service will mean to patrons of this line in the way of speedier, more reliable service.

Three of the series have already appeared. Each occupied a quarter page of space. These good-will ads are placed before the public in the form of letters signed by S. B. Way, president of the company. The ads follow:

May 21, 1926.

TO OUR PASSENGERS:

This company is authorized to operate one-man cars on the Walnut Street line, and will begin on Sunday, May 23.

That line will so operate as to provide you with safer, better and more frequent service.

This company does not profit by the change in method of operation. It hopes, ultimately, to gain some benefit, because this more ample and more convenient service should attract more car riders.

The cars to be placed in service on this line are newly painted and furnished. They are equipped for electric heat, and have the latest and best safety appliances.

They will run on schedules as fast as the two-man cars. There will be more cars in operation.

Our trainmen are careful and skillful. You will find them considerate in their service.

Use this new line and judge of the comfort and convenience of the service for yourselves.

S. B. WAY,
President.

(This is Number One of a series of letters to be published here.)

May 24, 1926.

TO OUR PASSENGERS:

The cars in the new Walnut Street service were on the line yesterday.

These cars have new equipment for your safety, comfort and convenience. These new features are fully described and illustrated in a leaflet to be distributed today to passengers on all of our city lines.

But these cars require no new or extra effort on your part when you ride in them. Use them as you do all other street cars.

You can tell one of these cars as far as you can see it. You will notice that it is newly painted in distinctive colors. Also it is newly furnished inside, and is equipped for electric heat.

It is a front-entrance car. The front entrance sign is in plain sight and brightly lighted.

It is a safety car. It has all the best safety equipment yet devised. It is the type of car certified by official authority in all the states, as safe, convenient and practical. We have confidence in this safety car.

It is you that the company desires to please because we want your business, and more of it.

You may judge this car for yourselves. We shall appreciate your comments.

S. B. WAY,
President.

(This is Number Two of a series of letters to be published here.)

May 26, 1926.

TO OUR PASSENGERS:

The new Walnut Street service was put in operation last Sunday.

There are now in use on that line, during the busiest rush periods, 21 one-man cars with 1,134 seats; instead of sixteen two-man cars with 832 seats—31 per cent more cars and 36 per cent more seats. In addition, during the heaviest rush hours, seventeen two-car trains are operated.

During other periods of the day, except for "owl schedules," there are proportionate increases of service.

The running time of the one-man cars between terminals is just as fast as before the change was made.

You get the benefit of more service, with no loss of speed, and the advantage of newly furnished cars equipped for electric heat and for greater safety.

The trainmen on these cars earn 5 cents more per hour. They have been carefully trained for this service. You will find them skillful and courteous.

There is no mystery and no secret about this "one-man car" business. It is the sensible, safe and widely used method to improve street car service by increasing its frequency. It is the *only* way to do so at practically the same cost.

Use these cars and judge this service for yourselves. Your comments will be welcome.

S. B. WAY
President.

(This is Number Three of a series of letters to be published here.)

No stone apparently is being left unturned by the company in its effort to acquaint—this time in an entirely new and novel way—patrons of its Walnut Street one-man car line in the fundamentals of the one-man car so that a better understanding of their operation and use may be gained. The company adopted the plan of having street car employees trained in public speaking present a short talk to passengers from the front of the car, after loaded cars were boarded, telling them in well-chosen words how to leave the car through the back door rear

treadle and explaining the mechanism of its operation with a view to its full use by patrons, particularly when cars are crowded. Five conductors have been transferred from their regular work for this special duty, which will continue until the company believes it has reached nearly all patrons under this new educational plan.

Uniformity of appearance will mark the use of one-man cars hereafter in Milwaukee. According to plans set in motion by R. H. Pinkley, assistant general manager of the company, all cars of the one-man type now in operation on the 27th, 35th, Center and Clybourn Streets lines are to be repainted an orange and cream color and equipped with imitation suede seats so that they will be easily distinguished from the two-man cars. The orange and cream colored one-man cars on the Walnut Street line have met with such favor that the company decided to standardize this color for its one-man cars.

Survey Suggested

In connection with the subject of transportation and transit matters in general the Milwaukee Electric Railway & Light Company, Milwaukee, Wis., has placed before the Common Council a request covering a comprehensive survey of Milwaukee's transportation needs, the cost of which will be met by the company providing it does not exceed $50,000. According to the outline of the survey contained in President S. B. Way's letter to the Council, this transportation check would be conducted by qualified engineers under the direction of a joint committee representing city officials, citizens, Railroad Commission and the company. The survey is to obtain an impartial insight into street transportation needs so as to make possible better co-ordination of transportation facilities, consideration of transportation needs in city planning and general improvement in transportation service.

Mr. Way explained that his survey plan is prompted by a similar check recently completed in Washington, D. C. He suggested that McClellan & Junkerfeld, the engineers who had charge of the survey there, be retained for the work in Milwaukee.

One-Man Car Case at Des Moines Argued

Oral arguments in the appeal of the Des Moines City Railway, Des Moines, Ia., from the decision of Judge Joseph Meyer in the Polk County District Court in favor of the local street car men's union have been presented to the Iowa Supreme Court. Ralph L. Read of Sargent, Gamble & Read represented the company, and C. C. Putnam the union.

Several months ago Judge Meyer held that a contract between the company and the union requiring that every car shall be in charge of a motorman and a conductor was valid and binding. The company maintained that an agreement of this kind is against public policy in that it prevents the company from instituting economies which would result in the reduction of fares. The contract was signed in 1915, and has nearly fifteen years more to run.

The railway has four one-man cars in operation in Des Moines. Pending the outcome of the appeal, two men are kept on each car, although the "conductor" has no duties. The company contends that if it were permitted to change to one-man cars a saving of nearly $200,000 annually could be effected in trainmen's wages alone.

No decision from the Iowa high court is expected before fall.

Test Period Likely at Tacoma

Plans for the settlement of the Tacoma transportation problem, undertaken by the new Mayor, Melvin G. Tennant, and the City Council, may not be submitted this fall to the people. This was indicated at the second conference between city officials and representatives of the Tacoma Railway & Power Company. It is proposed now that any plan worked out by the conference for possible adoption shall first be put into effect for a test period. R. T. Sullivan, general manager of the company, pointed out that the summer months are the poorest of the year for street car earnings, hence a reliable test might not be obtained during three summer months. In consequence there may be a six months test. In that event the plan would be submitted at the spring election.

Mayor Tennant asked the company officials for figures on the way in which a 7-cent fare would affect the earnings, following submission of figures on what the earnings would probably have been during the past year if the conditions of operation of 1920-21, with 10-cent cash and 8-cent token fare, universal transfers and no jitney competition, had been in force. Other figures on depreciation charges for ten years past were asked by E. K. Murray, city attorney, who is studying company reports. Manager Sullivan did not have a figure of valuation upon company property upon which he would expect a 6 per cent return in any proposed settlement, as was requested at the first meeting. He explained that inasmuch as the value of the property has been fixed by the State Department of Public Works, it will be simpler to retain this valuation and alter the return figure to whatever is deemed proper. Mayor Tennant suggested a figure lower than 6 per cent as proper upon the state valuation of about $7,000,000.

Many factors of street car operation were discussed, including the possibility of inducing the public to use the street cars for transportation, particularly to and from work, instead of operating automobiles and parking them all day.

The Mayor said:

> I think that before we are finished we will arrive at the point where we will hold that the man who drives his own automobile should pay a part of the cost of maintenance of railway service. Property is valued more if we have street car service than if we have none, or if we have good service rather than poor service. I think that at some point, somewhere, the auto driver should help pay for the service for the man who rides the street cars.

Mayor Tennant again went on record as against the city purchasing the railway system.

Two-Cent Increase for Detroit Municipal Men

An advance in wages of 2 cents an hour for platform men of the Detroit Department of Street Railways, without any increase in fares, has been tentatively agreed upon by the D.S.R. management. Announcement to this effect was made on June 21. It is expected that the new wage agreement will be approved by the Street Railway Commission. The increase was accepted by the men at a meeting held under the auspices of Division No. 26 of the Amalgamated Association.

It is estimated the increase will cost the city approximately $210,000 a year. The 7-cent increase asked by the men would have cost the department more than $1,955,000 a year.

If the agreement is ratified by the commission, the increase will be made in two steps, one of 1 cent an hour on July 1 and another like increase to become effective on Aug. 1.

A number of meetings were held, at which the committee representing the men and the D.S.R. officials discussed the changes in wages and in working rules asked by the men. The men included in their request the provision that all scheduled weekday runs of more than six hours and under eight hours shall be considered as regular runs and shall be allowed eight hours time. Of scheduled weekday runs 50 per cent must be completed within eleven consecutive hours. Forty per cent of all runs must be straight runs, as nearly equally divided as possible between day and night runs.

Thirty-five per cent of the total number of runs are to be completed within thirteen consecutive hours. Not to exceed 15 per cent of all runs may be extended to exceed thirteen consecutive hours to complete. Runs requiring more than thirteen hours to fourteen hours to complete will be allowed an additional ten minutes bonus.

It was further provided that runs requiring from fourteen hours to fourteen and one-half hours to complete will be allowed an additional twenty minutes bonus. Runs requiring from fourteen and one half to fifteen hours to complete will be allowed thirty minutes bonus, with one hour additional bonus for each additional hour thereafter.

Rates that apply to motormen, conductors and motor coach operators follow:

Two-Man Cars	Cents an Hour
First six months	67
Second six months	71
Thereafter	75

Rates that apply to one-man car motormen, also to operators of motor coaches or buses seating 35 passengers or more follow:

One-Man Cars	Cents anHour
First six months	72
Second six months	76
Thereafter	80

Owl car men, except one-man car motormen, will be paid 85 cents an hour. The one-man car operators will get 90 cents.

New York Warned Against Scrapping Trolleys

Eloquent Plea Made for Them by Railway Official Who Gave Facts and Figures

Decision was reserved on June 22 by the Board of Estimate of New York on former Comptroller Charles L. Craig's proposal to sell the Fourth and Madison Avenue, Eighth Avenue and Ninth Avenue surface lines to the city. At the hearing formal notice was received from the holders of receiver's certificates of the Second Avenue Railroad that that property was for sale.

In addition, Borough President Joseph A. Guider of Brooklyn offered a resolution for an inquiry to determine whether the Fulton Street elevated railroad in Brooklyn from Ashland Place to the East River should not be torn down, and Edward P. Doyle of the New York Real Estate Board, on behalf of the recently formed Third Avenue Association asserted informally that the city should buy and tear down the Third Avenue elevated line, which he said he believed could be purchased for about $28,000,000. No action was taken on Mr. Guider's resolution, which will be considered at a future meeting of the board.

The hearing on Mr. Craig's proposal was merely on the question whether the surface lines he offered for sale for $7,000,000 constituted obstructions to traffic and misuse of the streets. Representatives of a dozen civic organizations favored the Craig proposal. Mr. Craig confined himself to a short explanation of the technical situation, which requires the consent of the Transit Commission to the abandonment of the operation of the three lines, even if the city should purchase them.

The principal speaker against the Craig proposal was Gerhard M. Dahl, chairman of the board of directors of the Brooklyn-Manhattan Transit Corporation. His argument was more in the nature of a general plea for the retention of the surface lines, which carried more than 1,000,000,000 passengers last year, than a direct argument against the city buying the Craig lines. Mr. Dahl declared that it had been shown by the experience of many cities that the motor bus could not handle "mass" transportation. He added that it would require five buses to carry as many passengers as three surface cars, and asserted that if buses were substituted for cars the congestion would be increased.

Incidentally, Mr. Dahl declared that buses, on anything but short routes, could not be operated for a 5-cent fare, and said that no responsible applicant for the bus franchise had offered a 5-cent fare.

Mr. Craig said he believed that it had been shown that the surface lines in question did constitute obstructions to traffic, and that the purchase of the lines would enable the city to clear two arteries for traffic, one from the Post Office to the Harlem River by way of Madison and Fourth Avenues and the other from Vesey Street to the Harlem River by way of Eighth Avenue. The only north and south street in Manhattan now clear, he said, was Fifth Avenue, and this was blocked by Washington Square on the south and Mount Morris Park on the north.

John D. Fearhake, counsel for the holders of receiver's certificates of the Second Avenue Railroad, informed the board that the property of that company could be purchased by the city and that the certificate holders, the owners of the property, would be pleased to open negotiations. Upon suggestion of Mayor Walker, Mr. Fearhake said he would file a written offer.

It is hoped to present a summary of Mr. Dahl's remarks in an early issue of the ELECTRIC RAILWAY JOURNAL.

850 Car Stops to Be Eliminated at Detroit

The Common Council of the city of Detroit on May 28 unanimously approved a plan submitted jointly by the Mayor's committee on traffic and H. U. Wallace, the general manager of the Department of Street Railways, for the elimination of 850 car stops on the municipal railway system.

	Present Stops	Proposed Stops	Saving	Present Running Time, Minutes	Proposed Running Time, Minutes	Saving, Minutes
Jefferson	111	86	25	76	70	6
Grand River	173	136	37	130	118	12
Woodward	135	111	24	112	106	6

At the present time the Department of Street Railways is using the skip-stop plan outside of the business district, the stops on an average being approximately 600 ft. apart. Under the plan submitted to the Council the general scheme outside of the business district is to skip two blocks between stops, making an average distance of approximately 900 ft.

There are 3,400 stops on the Detroit system and the plans call for reducing this number to 2,550. The general manager in submitting the plan to the Council pointed out that reducing the number of stops would permit the department to cut the round-trip running time for the system by 212 minutes, and would also lessen the time of travel for passengers on street cars, speed up vehicular traffic in general and reduce to some extent the accident hazard. In laying out the proposed stops, the location of churches, schools and heavy loading and unloading points were all considered. It is estimated that the plan will result in a saving to the Department of Street Railways of approximately $600,000 a year.

An example of results which will be obtained through the elimination of some of the stops on three of the main lines of the system is shown in the accompanying table.

At the same meeting of the Common Council Mr. Wallace and Commissioner John W. Reid of the Department of Public Works presented a plan for the installation of approximately 100 protected safety zones to be constructed along several of the lines this year.

In addition to the elimination of stops and the construction of safety zones, it is planned to install traffic signals approximately 2,000 ft. apart in the outlying sections of the main lines for the purpose of breaking traffic sufficiently to permit passengers to enter and leave safety zones or for pedestrians to cross streets.

Paving Made an Issue in Ohio Cities

Disputes between municipalities and electric railways over the cost of paving between tracks are now attracting considerable attention in the section of Ohio near Springfield. On the heels of a battle between the Indiana, Columbus & Eastern Traction Company and the City Council of Bellefontaine over the paving of North Main Street in that city, a suit was filed in the Clark County Common Pleas Court by the city of Springfield against the Springfield & Xenia Traction Company seeking to obtain a judgment representing the cost of paving a street between the tracks of the company, and on top of this the city on May 25 served notice on the Springfield & Xenia Company that unless it agreed to pay the cost of paving between the tracks in another street the city would take steps to oust the tracks from the street.

The latest action in the Bellefontaine case was the issuance of a statement by Bellefontaine city officials charging that the traction company was delaying the paving work in North Main Street in an effort to "force through a franchise favorable to its own interests." The traction company recently, under instructions of Federal Judge Killits of Toledo, withdrew a car that was being used solely for local service in Bellefontaine and substituted instead stops by the regular interurban cars.

In the suit filed against the S. & X. by the city of Springfield the city had proceeded with the paving work and now seeks to collect for the traction company's share of the proceedings.

The threatened ouster action aimed at the company in the proposed paving of another street is being taken calmly by company officials, who declare that the company is not in a financial position to pay for the paving even if it is allowed to pay for it in ten annual installments as proposed by the city.

The railways are contending that street paving work is done solely as a benefit to motorists who are, in effect, competitors of the traction companies.

Drama in Grand Rapids Screened

A screen version of the railway pageant in Grand Rapids, Mich., was enacted at the office of Hodenpyl, Hardy & Company, New York, N. Y., on June 25 before several spectators, who were both edified and delighted—edified at such a demonstration of civic pride on the part of the residents of Grand Rapids and delighted with the proof of transportation progress in that city. How the young and old turned out on June 12 to welcome the 27 new electric rail coaches, ushered into service by the Grand Rapids Railway, is now a part of the history of the West, the details of which were given in the ELECTRIC RAILWAY JOURNAL, issue of June 19, page 1069.

Banker Opposes Pending Traction Ordinance

In a communication to the local transportation committee of the Chicago City Council, Albert W. Harris, chairman of the Harris Trust & Savings Bank and of the protective committee representing the Chicago Railways' first mortgage bondholders, has declared that the kind of enabling legislation that is suggested in the proposed traction ordinance would neither be acceptable nor would it restore credit. It would vest the regulation and control of one of the contracting parties in the hands of the other and is unsound financially, he said.

Mr. Harris did not speak for the bondholders officially, but intimated that investors will not buy the new traction securities if the city of Chicago, through some agency created by itself, is to regulate local transportation under a terminable permit. He said:

> I do not consider this the time to discuss the details of a franchise. The ordinance as submitted, even if approved by the voters, would not be a contract or an operating agreement because the necessary legislation is lacking.
>
> In addition, whatever agreement might be reached at this time would not be binding upon either the city or the surface lines and, therefore, I would not regard this draft of an ordinance in the nature of a franchise but as a memorandum of what must be done before a franchise can be granted.

Mr. Harris insisted that legislation must first be obtained before a solution of the traction problem can be attempted. Henry A. Blair, president of the Chicago Surface Lines, expressed substantially the same opinion in an earlier letter to the framers of the present draft.

The banker approved, however, the suggestion of the City Council that the Surface Lines be consolidated into one company and expressed satisfaction with the plan for an operating agreement between the surface and elevated line.

Operation Resumed Over Cincinnati, Milford & Blanchester

The Cincinnati Street Railway, Cincinnati, Ohio, which recently purchased the Cincinnati, Milford & Blanchester Traction Company for approximately $50,000, has resumed operation over the route. Sale of the company's assets to the Cincinnati Street Railway was approved several weeks ago by Edgar Dow Gilman, Director of Street Railroads and Buses. The cars of the Cincinnati, Milford & Blanchester Traction Company are in the shops of the street railway for overhauling. Pending their repair large one-man cars are being operated over the line, between Madisonville and Milford, but later cars will be operated through between Government Square and Milford. In the meantime the Madisonville car line will be used between Madisonville and Government Square. Walter A. Draper, president of the Cincinnati Street Railway, said that some of the Cincinnati, Milford & Blanchester cars would run only between Madisonville and Mariemont, while others would go through to Milford. The newly bought line serves Mariemont particularly, one of the fastest growing suburbs in Hamilton County.

Week-End Safety Drive in Baltimore

With the coming of weather which takes the people out of doors at every opportunity, Baltimore has its quota of week-end accidents of all kinds. The newspapers on each Monday morning usually chronicle a long list of accidents that occurred the day before while the public was seeking recreation from the weekly grind. It is with the view of



reducing these week-end accidents to the minimum that the United Railways & Electric Company has launched an unusual campaign. Although the company continues with its regular safety work, which is being carried on all the time, it has started the drive against week-end accidents as a supplementary campaign.

The new work has been undertaken by the safety department of the company, and the Baltimore Safety Council also is expected to join the United in bringing about a reduction in the number of week-end tragedies. Although the company is bringing its work prominently before the attention of the public in general, it is spending much effort in impressing the idea upon the operating employees of the company. Car cards also are being used by the company to bring the objects of the campaign to the attention of the public.

To Operating Employees

All of us know the week-end toll from accidents. Monday's newspapers carry columns about these mishaps. In many cases lives are lost. Untold suffering and economic waste lie in the wake of accidents. A program of prevention is entitled to the earnest thought of every one in this community.

People want to be in the open at this season to enjoy the beauties of nature. Automobiles increase on the streets every day, and all who can seek the out of doors.

This means more situations requiring your timely and proper judgment to prevent accidents.

In the interest of public safety, we are co-operating in efforts throughout the city to

Prevent Week-End Accidents

We have the utmost confidence that every man in this company will lend his full assistance to this worth-while effort.

The responsibility is placed squarely upon you and we know you will be equal to it.

"Help Prevent Week-End Accidents," they read.

Large posters, measuring 24 by 32 in., have just been placed in each of the company's 23 carhouses. They are signed by the safety department. Three-inch letters in green ink are used. The poster is reproduced herewith.

Further to impress the campaign upon the minds of the operating employees more than 4,000 cards have been distributed to motormen, conductors and bus drivers. The text of this card accompanies this account. Its wording shows how great a responsibility the company places upon every employee in its drive for safety.

Raymond S. Tompkins, assistant to the president of the United, said that he feels confident that the drive to cut down the number of tragedies that occur over every week-end during the nice weather will have good results. He emphasized, however, that the regular safety work conducted by the company, which is being carried on at all times, is not being slackened.

New York State Railways Entertains School Children

School children of Rochester, N. Y., have no better friend in all the city than the New York State Railways. For, thanks to the trolley company, more than 40,000 kids will frolic this summer at Sea Breeze Park, the big amusement resort owned by the railway. Transportation to and from the park, tickets of admission and for all amusement devices are provided free by the company. The railway will play host at a series of five outings, entertaining about 8,000 at a time. The picnics are in the nature of a reward for the co-operation of the school children in making the streets of Rochester safer. The movement is part of the safety program being carried on by Leon R. Brown, safety director of the company. The railways opened Sea Breeze Park, with its new $1,000,000 natatorium and salt water pool, on Memorial Day with a record crowd attending. The resort is in charge of Bertram E. Wilson, general passenger agent of the railway.

St. Louis Books Under Investigation

The Missouri Public Service Commission at Jefferson City, Mo., has decided to audit the books of the United Railways, St. Louis, for 1925 and part of 1926 before finally passing on the application of Receiver Rolla Wells for increase in fares from 7 to 8 cents. The company proposes to sell two tokens for 15 cents and not to disturb the present fare for children, 3 cents. The decision of the commission to go over the books, effective within ten days, means that it will be at least three months before it can get to the question of whether the company is entitled to more fare. Experts estimate that it will require at least three months to make the audit, and it is very uncertain how soon the accountants on the commission's staff can visit the car company's headquarters.

Hearings Soon on Proposed St. Louis Franchise

Provision for a $1,000,000 revolving fund is embodied in the incomplete franchise ordinance in favor of the United Railways, St. Louis, Mo., which Mayor Victor J. Miller will soon present for public consideration. This fund is an integral part of the service-at-cost principle on which the franchise will be based. If this fund gets too low fares will be raised; if it increases too much, fares will be reduced.

The tentative franchise draft also provides for a traffic commissioner who will look after the city's interests in the operation of the railway system. The salary of this director and the expenses of his office are to be paid by the company, but the total of both must not exceed $50,000 annually.

Members of the reorganization committee of the United Railways do not wish to have included in the grant a provision against the use of one-man cars and other regulatory measures sought by the car men's union; also the reorganization committee wants a 7 per cent return to the company before the payment of taxes.

Other points at issue are the continuation of the mill taxes and other special taxes, such as street improvement and repairs, now assessed against the company. The City Board of Estimate and Apportionment, which has considered the desires of the company officials in this regard, realizes that under the service-at-cost system the car riders pay the taxes, but pleads the necessity for maintaining the taxes as the city cannot increase its tax revenue in the regular channels.

Mayor Miller plans to leave these points open in the draft of the measure to be submitted for public consideration so that he can obtain the reaction of the citizenry.

Stagger System Suggested for Smoky City

The stagger system of spreading rush hours to relieve congestion in the downtown triangle has been officially approved by the Better Traffic Committee at Pittsburgh, Pa., and definite steps have been taken to bring about the cooperative use of the system.

Adoption of the stagger system was proposed by Frank L. Duggan, as chairman of the sub-committee on traffic flaws, which voted unanimously a few days ago to approve and recommend the system for adoption. The outcome of a rather brief discussion was that the committee members passed a motion which entitles Mr. Duggan's subcommittee to continue in a campaign which it is hoped will result in the general use of the system.

Proponents of the system, led by Mr. Duggan and Mr. Marsh, pointed out that the worth of the system might be studied in cities where it is now in use, such as New York, Cincinnati and Chicago. It was also cited that the stagger system is being used successfully by several large Pittsburgh concerns and in some of the larger office buildings. The Pittsburgh Building Owners and Managers' Association's approval and indorsement of the system was used as a favorable argument. It was made clear that the committee was not rushing blindly into the matter, but was merely approving the idea, without taking any rash action. This swayed the skeptics and the motion was passed.

Deadlock Over Toledo Wages

Representatives of the Community Traction Company, Toledo, and the car men's union have been deadlocked for nearly a month on the wage issue in the new contract between company and employees. The wage scale June 1 was 50 cents for the first three months, 52 cents for the next nine months and 55 cents thereafter, with 5 cents an hour added for one-man or bus service.

The men asked a flat increase of 10 cents an hour and the company prepared to grant them 2 cents an hour with certain arrangements for part rebate on new uniforms. J. Frank Johnson, vice-president and general manager of the company, following the rejection of the company offer, wrote Mayor Fred J. Mery and the members of the Board of Street Railway Control that the increase asked by the men, if granted, would mean a sure advance in token fares on the railway lines. This announcement apparently drew no comment from those officials and the situation has remained with no agreement.

The old contract provided for arbitration of differences in case an agreement could not be reached. So far neither party appears to desire to submit the problems to arbitration.

Talk of Terminal Electrification Renewed at Chicago

The promise of electrified operation of suburban trains of the Illinois Central Railroad by July 15 has revived talk in Chicago of universal electrification of the city's railway terminals. Clamorous editorials based on recent news articles describing the results of similar undertakings in New York and Philadelphia are appearing in Chicago newspapers almost daily.

Sentiment in favor of this civic improvement was first actively aroused in 1915, when the railroads that enter Chicago, under the guidance of the Association of Commerce, compiled and published an elaborate report on terminal electrification after four years of investigation. The report estimated the cost, including parallel betterments that would be necessary, at $274,440,630. The railroads announced that under existing conditions the project was financially impracticable and the matter presently languished.

Mayor William E. Dever thinks that it is now opportune to reopen negotiations. He has asked the City Council to appoint a committee to learn the attitude of the various railroads and navigation companies toward a program looking to reasonably prompt replacement of their existing smoke-producing locomotives and tugs by electric or oil-electric equipment. He suggests, further, that the committee prepare legislation similar to that passed in New York requiring the elimination of smoking railway and navigation equipment after a fixed date.

They Rented the Entire Trolley System

Down in Jacksonville, Fla., Cohen Brothers wanted recently to put on a big sale. In order to be certain that all the Kellys who desired to come down town to shop on the opening day would get there they chartered the entire railway system, with excellent results.

The Jacksonville Traction Company has a peak hour from 7:30 in the morning to 9. After that traffic is light until the evening peak hour. This starts around 4 in the afternoon. The entire trolley system was Cohen Brothers' for two hours from 9 in the morning until 11. During that time everybody, regardless of where they boarded the car and regardless of where they were going, rode free. Circus days had nothing on the two hours of the opening day of this sale. Free trolleys were a great success.

In renting the system to the department store the railway took the number of cars on schedule and the seating capacity and arrived at the total seating capacity for those two hours. Then the management multiplied this number by 6.7 cents, which is the average fare in Jacksonville. The nearest even product of this multiplier and multiplicand was accepted as the flat rate to charge the department store for the rental of the system. In this case it was $350. This was the price that Cohen Brothers paid for the rental of the entire trolley system for two hours.

In checking up after the day's business it was found that after deducting the $350 rental paid to the railway by Cohen Brothers the revenue for the day was just $20 less than the total business done on the similar day of the previous week. Adding the $350 rental fee the day's gross revenue was more than $300 greater than on the similar day of the previous week. So from the viewpoint of the railway the sale by Cohen Brothers was a financial success.

Officials of Cohen Brothers report that their lease of the railway was one of the best advertising stunts that they ever "pulled." They used liberal newspaper space, but the total cost of all of the advertising was less than 1 per cent of the volume of business done, a figure considered remarkably low. Much of the success of the sale they attribute to the free trolley idea.

Large Sums Paid Into Welfare Fund

The Twin City Rapid Transit Company, Minneapolis, Minn., paid $63,232 into the welfare fund for employees in 1925, while the employees paid $34,618. For the year the budget was $100,123. Payments to beneficiaries of employees who died in the year were $71,000. Insurance for total disability was $5,600. Among other payments were $1,687 for 58 accident disabilities and $19,379 in 940 cases of illness. At the end of the year the total in the thrift fund was $291,615. Among the activities conducted for employees are mentioned operation of a 40-piece band, trainmen's clubrooms, trainmen's baseball league and entertainments for families.

Experts Will Make Surveys in Cincinnati

The sub-committee of the City Council of Cincinnati, Ohio, named to negotiate a lease for the rapid transit system to the Cincinnati Street Railway has agreed to engage experts to make traffic surveys before entering into any definite agreement with the railway for the operation of the system. The experts will be employed as soon as the committee can reach an agreement as to who shall pay the cost of making the survey. Some members of the committee are of the opinion that part of the expense should be defrayed by the street railway, car riders and taxpayers. Others contend that it should be a 50-50 proposition between the railway and the city.

The experts to be employed, it was agreed, must determine three major questions: What changes are to be made if any in the plan of the rapid transit system to co-ordinate its use with the surface lines to insure operating success? What patronage reasonably may be expected for the system? How can traffic be diverted from the surface cars and what would be the effect upon the fare now being charged on the present system?

The committee is in receipt of letters from a number of experts regarding making the survey. E. P. Goodrich, former vice-president of the New York Technical Advisory Corporation; Ross W. Harris, Madison, Wis.; the Beeler Organization, New York, and Kelker, De Leuw & Company, Chicago, have applied for the contract to make the survey, the cost of which is estimated at $50,000.

Rehabilitation Promised in Boise

The immediate rehabilitation of the lines and equipment of the Boise Street Car Company, Boise, Idaho, was promised the City Council recently by W. E. Pierce, president of the company. Mr. Pierce said he expected to pay all tax delinquencies, repair the lines and go ahead with the transportation system as it is at the present time. It is likely there will be a bus connection with the railroad station carrying passengers from the station to some downtown point. For many months the Council has been discussing the transportation problem in Boise with Mr. Pierce and, until recently, with W. E. Young, Portland, who wanted to put buses on the streets of Boise.

Voters Not Likely to Have Franchise Question This Summer

No hope for submission of a franchise amendment to the voters of Toledo, Ohio, at the August primary election is held out by those in close touch with municipal affairs.

The supplementary report of Prof. H. E. Riggs, furnished a few weeks ago, containing the memoranda of agreements on engineering matters connected with a solution of Toledo transit problems between Professor Riggs and engineers representing Henry L. Doherty & Company, has been ordered printed by the City Council and the Mayor has been authorized to negotiate further with Mr. Doherty. Members of the Street Railway Board of Control expressed the opinion that Mr. Doherty should easily be able to agree to everything in the supplementary report, but that there were other fundamental problems in connection with a settlement of issues in Toledo that have not been touched.

Difficulties of writing off a portion of the capital, adjusting the deficit in the stabilizing fund and the sinking fund and the problem of raising new money for the $2,000,000 or more capital required are all matters to be worked out before any proposal may be submitted to the voters.

Wage Agreement Renewed at Ottawa

The Ottawa Electric Railway, Ottawa, Canada, renewed its wage agreement with its trainmen on June 11. The present agreement, which will remain in force until May 1, 1928, provides for the following wages in cents an hour: For first year conductors and motormen 45 cents; second year, 47 cents; third year, 48 cents; fourth year and thereafter, 50 cents; for one-man car operators 5 cents in excess of the regular rate.

The phraseology of this agreement permits an understanding with any individual employee or any group of employees. It is a strictly open shop agreement, but it guarantees no discrimination against membership in a union or other association.

Labor Question at Indianapolis in Courts

Dismissal of a suit filed by the Indianapolis Street Railway, Indianapolis, Ind., against the Amalgamated Association, Robert Armstrong and John M. Parker, vice-presidents, was asked in two motions filed in the federal court on June 16 by Frank P. Baker, attorney for the defendants. The motions were filed on behalf of the organization and the two officials. The first declared there is no diversity of citizenship and the other alleged that a statute cited prohibits the court from granting a permanent injunction against the organization to prevent it from attempting to unionize the employees of the local utility. A temporary injunction recently was granted by the court to prevent the Amalgamated from continuing its work of organizing the employees.

Third Arbiter Named.—After more than two months of negotiations Judge Malcolm R. Patterson, former Governor of Tennessee and now Circuit Court judge, was selected as the third arbitrator in the wage dispute existing between the trainmen and officials of the Memphis Street Railway, Memphis, Tenn. The two other arbitrators are Lovick P. Miles for the company and A. B. Galloway for the motormen and conductors. The men seek an increase of 12 cents an hour. The company has a counter proposition calling for a decrease in wages.

Lower Rates in Effect.—Special excursion tickets at a fare of $2 for the round trip between Los Angeles and Mount Lowe, Cal., were placed on sale by arrangement of the passenger traffic department of the Pacific Electric Railway, Los Angeles, Cal. Tickets at this reduced fare are sold for use on Wednesdays and Saturdays only, the regular fare of $2.50 remaining in effect during other days of the week. Return limit of the tickets is seven days from date of sale, which allows passengers an opportunity to stay over at Mount Lowe Tavern and cottages, should they so desire. The rate from Pasadena in connection with this Wednesday and Saturday special excursion fare is $1.75 for the round trip, in place of the regular fare of $2.10.

Service to White Plains Increased.—Leverett S. Miller, president of the New York, Westchester & Boston Railroad, announced on June 20 that trains would be operated between New York and White Plains every twenty minutes, 24 hours a day, beginning July 1. At present only one or two trains are run to White Plains between midnight and 6:30 a.m. The increase in the passenger traffic of the road caused the change in the schedule, it is said. In 1925 the passenger traffic increased 14 per cent.

Wage Scale Renewed in Youngstown.—The wage scale for the trainmen and bus operators of the Pennsylvania-Ohio Electric Company and the Youngstown Municipal Railway, Youngstown, Ohio, was continued recently by agreement for another year. The wage scale for two-man operation is 48 cents an hour for the first three months of employment, 51 cents an hour for the next nine months and 57 cents an hour after the first of the year. For one-man operation 5 cents an hour additional is paid on each of these classifications. However, the company has virtually no two-man operation, so that the dominant rate is 62 cents an hour.

Music Lovers Given Special Service.—The United Railways, St. Louis, Mo., has put on special service on its Delmar division to accommodate patrons of the Garden Theater, which opened its season on June 14. At the terminus of the Delmar division in University City extra cars transfer the operagoers direct to the theater.

Asks 15 per Cent Rate Increase.—Declaring that the average increase in cost over 1914 prices has been more than 110 per cent, compared with an increase in rates over the same period of only 24.4 per cent, the Chicago, Aurora & Elgin Railroad, Aurora, Ill., filed a petition on June 15 with the Illinois Commerce Commission in which permission was asked to increase passenger rates 15 per cent. The new rates would become effective July 15. The petition contends that the rate increase would bring fares up to the existing commutation rates of the steam railroads. Suburban rates on several of the steam railroads entering Chicago were raised, last January, 15 per cent, and on others approximately 20 per cent. Britton I. Budd, president of the company, points out that the earnings on the company's investment are grossly inadequate.

Recent Bus Developments

Steam Road Not Disposed to Test Minnesota Bus Act

The railroads have, for the time being at least, dropped their legal fight against the Minnesota law, passed by the last Legislature, controlling the operation of buses over public highways. On the eve of the hearing of a suit on June 15, brought by the Chicago Great Western Railroad against the Jefferson Highway Transportation Company in the Hennepin District Courts to test this phase of the law, giving the Minnesota Railroad and Warehouse Commission charge of bus routes and rates, the railroad dropped the action. The Jefferson company runs a bus line parallel to the Great Western tracks to Rochester, Minn., and each carries thousands of passengers annually. The steam line's contention was that when a steam road served between two points a bus line should not have permission to operate also. The road is now expected to try to win its point by competition.

The steam road runs regular service between the Twin Cities and Rochester and has a special daily round-trip Red train to serve especially patrons of the Rochester hospitals. The bus company has been operating parlor coach buses and contended that there was a public demand, both as a necessity and a convenience, for this service over one of the most heavily traveled rural routes in the state. The commission granted the certificate and held in abeyance the route and rate of fare. This supplementary order was delayed on account of the suit in court. E. F. Zelle, president of the Minnesota Motor Bus Association, said:

> We regard the decision of the Great Western as far reaching, since it indicates the railroads recognize the highway motor bus as a fixed institution in the transportation system and a service the public demands as necessary and convenient.

A. G. Briggs of counsel for the railroad said:

> We believe we will be able to obtain our share of the business. The railroad now proposes to fight it out with the Jefferson on the basis of competitive service, rather than by litigation.

The action as brought by the railroad was the first appeal, as permitted under the new law, from a decision of the commission. It was filed April 21 from the commission's order of March 26. On May 26 the court issued an order setting the trial for June 15 and before that time a stipulation of dismissal was filed.

Chester Lines Absorb Cab Service

Charles B. Cooke, Jr., president of the Chester Valley Lines, which includes the Westchester Street Railway, West Chester, Pa., has announced the acquisition of all the holdings of the Wilmington Yellow Cab Company from Frank V. du Pont, J. A. Montgomery, G. Dare Hopkins and Hollyday S. Meeds, Jr. Effective on July 1 the new management will operate the cab service in conjunction with the Chester Valley Lines system. This system includes more than 200 miles of bus routes in the Schuylkill Valley section, southeastern Pennsylvania and the upper part of the State of Delaware.

Employees Fail to Stop Bus Operation

Judge Sanderson in the Massachusetts Supreme Court has dismissed the petition of the Amalgamated Association in which it sought to enjoin the Boston & Worcester Street Railway and its receiver, Franklin T. Miller, from operating buses between Boston and Worcester.

According to the petition, the Amalgamated employees contended the railway was under agreement with it not to institute new methods of transportation not covered by the agreement without first submitting the question to a conference. The railway and its receiver argued that the receiver could not be sued without express permission from the court, of which he is an officer.

This action by the union was the subject of an item in the ELECTRIC RAILWAY JOURNAL for June 5, page 990, in which it was brought out that the union contended that bus transportation jeopardized positions held by members of the association and that the agreement between the union and the railway provided that at the introduction of a new method of transportation the matter of the status of the employees would be settled by a conference between the union and the company.

Utilities Commission Should Regulate Utah Buses

The question as to whether the Public Utilities Commission has the right to control the operation of auto stage lines, or other motor vehicles which use the public highways for transporting either freight or passengers as common carriers was settled by the Utah Supreme Court on June 2. The opinion, handed down in the case of T. M. Gilmer against the Public Utilities Commission and others, and written by Justice J. E. Frick, held that such control and regulation are within the right and power of the commission. The judge declared that the purpose of the utilities act is to prevent one public utility from destroying another.

The difficulty arose when T. M. Gilmer petitioned to increase the service of the bus line between Salt Lake and Fillmore after he had obtained it from the original owner, Joseph Carling, who operated only one round trip between the two points each week. Among the protestants were the Orem line and the Los Angeles & Salt Lake Railroad. The commission denied the application and also denied a request for a rehearing of the case.

Rhode Island Demands Bonds

Suspension of the public service registrations of 33 buses operating in interstate commerce out of Providence, R. I., was announced on June 17 by the State Board of Public Roads. Following this, Deputy Chief Inspector Harold W. Shippee and several assistants started to remove the public service plates from the vehicles involved as they appeared at the bus terminals in Eddy Street on their regular schedules.

The suspension and removal of registration of the buses was based on the failure of the owners of the vehicles to file bonds with the State Treasurer for the protection of the public in case of accident.

As each bus drove into the terminal Mr. Shippee told the driver that he could either put his bus in a garage or run it out of the state and keep it there, the alternative being arrest. One of Mr. Shippee's assistants would remove the public service plate from the front of the bus. That ended the process.

Twenty concerns operate the 33 buses banned from the roads. About 135 buses remain in interstate traffic.

Hearing on Western Motor Coach

Because of insufficient evidence the hearing on the application of the Western Motor Coach Company to operate buses between Chicago, Ill., and western suburbs in competition with three steam railroads was continued from June 15 to June 30. This company recently applied for a certificate of convenience and necessity to operate buses on four main routes out of Chicago following in general the line of the Chicago, Aurora & Elgin Railroad and supplementing that service.

More Bus Substitutions in Akron

Application has been filed with the city of Akron by Northern Ohio Power & Light Company for the abandonment of three of its Akron city car lines. The company desires to substitute buses on these lines. The lines are the Bowery Street, North Howard Street, and Grant Street. A conference between officials of the company and city officials was held on June 23. Action probably will be taken on June 29.

Line in Olean Approved.—The Public Service Commission authorized on June 18 the Olean, Bradford & Salamanca Bus Line, Inc., subsidiary of the Olean, Bradford & Salamanca Railway, to operate a bus line in the city of Olean, N. Y., and from that city to the village of Richburg. The proposed route will be about 21 miles in length. Four round trips will be operated daily and the through fare each way will be $1.10. It is understood that the Olean, Bradford & Salamanca Railway will now undertake proceedings to abandon that part of its trolley line extending from Portville to Bolivar, and thereafter the residents of this territory will receive service from the new bus line. The proof presented to the commission on the application in this case was to the effect that the operation of the trolley line to Bolivar was unprofitable.

Financial and Corporate

Companies in Middle West to Be More Closely Affiliated

Changes have been announced in the North American Light & Power Company which will result in the Studebaker interests being joined by the North American Company and the Middle West Utilities Company, the latter a Samuel Insull group, in the common stock ownership. Clement Studebaker, Jr., will remain as president of the company.

The North American Light & Power Company, serving 700 communities in Illinois, Iowa, Missouri and Kansas, through subsidiaries, is the holding company which owns the common stock of the Illinois Power & Light Corporation, of which Senator William McKinley of Illinois has been chairman of the board. The latter company is the Studebaker-McKinley operating company which owns the McKinley Bridge at St. Louis and the Illinois Traction System, the longest electric trunk line railroad in the world.

A large share of the common stock of North American Light & Power will be taken over by the Middle West company and the North American Company, the oldest and largest utility holding corporation in the Middle Western States. The operating staff of the North American Light & Power will remain unchanged.

The subsidiaries, Illinois Light & Power, Missouri Power & Light and other operating companies, will not be affected by the reorganization.

Certain new financing of the North American Light & Power is in prospect, Mr. Studebaker said, but the plans are not completed.

Interconnection with power lines of the Middle West Utilities subsidiaries will be one of the chief benefits of the reorganization. The consolidations will enable the plants of the two groups to unite high voltage, long-distance transmission lines over a greater part of the Central West.

Protective Committee for Indianapolis & Northwestern

A committee has been formed to protect the interests of holders of the 5 per cent twenty-year first mortgage bonds of the Indianapolis & Northwestern Traction Company, Indianapolis, Ind. The members are D. P. Abercrombie and George Treat of E. H. Rollins & Sons, B. L. Allen, vice-president Irving Bank-Columbia Trust Company; C. F. Mills, vice-president First National Bank of Boston; E. W. Stout, vice-president Fletcher American National Bank of Indianapolis, and Oscar Haussermann, 1 Federal Street, Boston, secretary.

The committee purposes to act in the proposed merger by consolidation or sale of the Terre Haute, Indianapolis & Eastern Traction Company and subsidiaries with the Terre Haute Traction & Light Company, the Indiana Electric Corporation and the Central Indiana Power Company and subsidiaries.

The committee has announced that when the readjustment plan and agreement have been perfected and approved, depositing bondholders will have the right to inspect the plan or to withdraw bonds without expense within two weeks.

$5,000,000 from Receivers

This Amount Turned Over to Special Master by the Kansas City Railways Operators

Funds in the hands of the receivers of the Kansas City Railways, Kansas City, Mo., aggregating more than $5,000,000 were turned over to John T. Harding, special master commissioner, on June 19. Of this amount, $5,038,109 was in United States securities at the market value of June 16, 1926; $39,131 —the accrued interest at June 16 on the securities; $148,902 representing the final payment on court order of Sept. 3, 1925, providing for the partial distribution to bond and note holders in the sum of $1,599,788; and $21,356 in cash. A sum amounting to $250,000 was left in the hands of the receivers for working capital, assuring operation until the transfer of the property is complete.

In confirming the sale of the Kansas City Railways to the new Kansas City Public Service Company during the week ended June 19, Judge Kimbrough Stone expressed the opinion that the receivership should be terminated and the property transferred to the new owners about Sept. 15.

An appeal from the confirmation was taken by Blatchford Downing, attorney for the second mortgage bondholders. His appeal will have no effect on the ending of the receivership. It will be heard in the Eighth Circuit Court of Appeals, probably at the December term in St. Louis. One of Mr. Downing's main contentions is that his clients were circumvented illegally when the first mortgage bondholders settled with the personal injury claimants and lawyers, whose claims were junior to the second mortgages.

The allowances made by the court to the receivers and to those connected directly and indirectly with the receivership, as announced in ELECTRIC RAILWAY JOURNAL for June 19, page 1076, aggregated $700,000 for the full period of the receivership. Frank P. Sebree, attorney for the stockholders of the old company, voiced the only protest to the allowances. Judge Sebree has 60 days in which to appeal from the confirmation. However, the case of the second mortgage bondholders now is severed from that of the stockholders.

The biggest task remaining before the property is turned over to the new owners is the assembling and indorsement by Mr. Harding of about $23,000,000 in first mortgage gold notes on deposit in bank vaults in several large cities. These bonds will be assembled in a vault in the Federal Reserve Bank in Kansas City within the next 30 days. They will be turned in as payment for the company and new securities issued to the holders.

Gross and Net Earnings Increase on Illinois Power

During 1925 the gross earnings from operation of the Illinois Power & Light Corporation, Chicago, Ill., after eliminating inter-company items, increased about 9 per cent and the net earnings on the same basis, after maintenance and taxes, increased approximately 16½ per cent over the previous year. At the same time the ratio of operating expenses to gross income was bettered by 2.36 per cent. The ratios of earnings available for bond interest and preferred stock dividends were well maintained and the company's securities continued to enjoy a good market and a steady demand. These statements were included in the annual report to the stockholders of the company.

In the railway division many improvements and extensions of service have been made. One hundred freight cars have been added to the rolling equipment, a new storehouse has been built at Decatur and a new passenger and freight terminal completed at Joliet.

Throughout the entire Illinois Traction System new ballasting was steadily going on and much new heavy rail laid, with the result that the roadbed is in good condition. Seven new automatic substations have been placed in operation, six new 1,000-hp. electric locomotives have been put into service and connection made with the St. Louis, Troy & Eastern Railroad, tying the two together as an operating unit. The first group of twenty-two 1-ton trucks, for use in extending the growing express business to include a daily pick up and delivery at terminals, has been installed with marked success.

From an insurance and protection standpoint the showing has again been very creditable. Every employee is covered by the $500 policy of group insurance provided by the company and

COMPARATIVE STATEMENT OF EARNINGS OF THE ILLINOIS POWER & LIGHT CORPO RATION

Gross Earninga	1925	1924
Electric light and power..	$15,817,324	$13,871,432
Electric and steam railroads	6,763,656	6,032,489
City railways and bus lines	4,248,821	4,258,005
Gas	3,191,720	2,973,364
Heat	672,394	685,777
Bridge	589,691	591,240
Ice	254,670	169,027
Water	88,303	101,125
Miscellaneous	21,816	1,239
Combined gross earnings	$31,648,398	$28,683,702
Less inter-company	2,566,345	1,984,273
Gross earnings from operation	$29,081,553	$26,699,429
Expenses and taxes	18,472,214	17,592,058
Net earnings from operation	$10,609,339	$9,107,380
Other income	203,445	500,585
Total net earnings	$10,812,784	$9,607,966

on Dec. 31, 1925, 3,826 were members of the death benefit division of the Hospital Association. Forty-seven deaths occurred among the employees during the year and more than $50,000 was received by their beneficiaries. Attention was paid to the educational, safety and accident prevention work.

$1,250,000 North Shore Bonds Sold

Halsey, Stuart & Company, New York, and the National City Company, New York, recently offered for subscription at 96½ and interest, yielding about 5.75 per cent, $1,250,000 of first and refunding mortgage 5½ per cent gold bonds, series B, of the Chicago, North Shore & Milwaukee Railroad, Highwood, Ill. The bonds come due April 1, 1956. The bonds were issued on account of the construction of the extension of the company's line from Niles Center to a point on the main line near Lake Bluff, Ill.

Railway's Revenue Decreased.—The Barcelona Traction & Power Company, Ltd., Barcelona, Spain, reports a revenue of $3,678,234 in 1925 against $2,999,287 in 1924. The balance realized in 1925 is $1,248,096 against $74,672 in 1924. The revenue of the railway department for the year showed a considerable decrease, resulting partly from an accident on the railway of the Ferrocarriles Cataluna between Las Planes and Sarria, which resulted in many deaths and injuries. Revenue was also decreased because of the lower spending power of the working classes. The company carried 17,527,373 passengers in 1925.

New Jersey Earnings Increase

For the first four months of 1926, net income of the Public Service Corporation of New Jersey available for dividends was $4,989,998, an increase of $2,127,093, or 74.3 per cent over the corresponding period of last year. After preferred dividend requirements, this was equivalent to $3.14 a share on 1,192,371 shares of common stock outstanding April 30, against $2.16 a share earned on 886,774 shares outstanding April 30, 1925.

Net income for the year ended April 30, after all charges, including depreciation, totaled $12,122,418, a gain of $4,214,336, or 53.3 per cent over the preceding twelve months, and equivalent, after preferred dividends, to $7.27 a share on the above amount of common, as compared with $6.03 in the preceding twelve months.

Railway and bus earnings in April showed further improvement. Combined operating revenues were $2,721,053, an increase of $337,133 over April of last year, while operating expenses of $2,197,275 were $211,389 greater. The Public Service Railway net income for the month was $85,631, against $11,407 a year ago. The Public Service Transportation Company, which operates the buses, reported net income of $18,663, compared with a deficit of $24,459 in April, 1925. Combined net income was $104,294, against a deficit of $13,051 in the corresponding month last year.

For the first four months of this year, the consolidated statement of trolley and bus operations showed a deficit of $317,715, against $898,698 for the corresponding period of 1925. For the twelve months ended April 30, the deficit was $124,198, against net income for the preceding twelve months of $1,122,647, which resulted from the intercompany sale of the Public Service Newark Terminal and real estate adjacent thereto.

More Properties Taken by Southeastern Power & Light

The Southeastern Power & Light Company has acquired the Georgia Light, Power & Railways, Athens Railway & Electric Company, Georgia Southern Power Company and the Georgia Utilities Light Company. These companies serve 42 municipalities. They will be supervised by the Georgia Railway & Power Company, which recently was acquired by Southeastern.

Georgia Light and Athens Railway were acquired from the Henry L. Doherty interests. An issue of $12,500,000 of debentures offered this week by Southeastern will be used in part to pay for the purchase and to finance additions which will increase the output of the system by 100,000 hp.

Net on Havana Railway Division, $486,275

The railway department of the Havana Electric Railway, Light & Power Company, Havana, Cuba, during the year ended Dec. 31, 1925, used 33.2 per cent of the power plant output, against 32.3 per cent in 1924, and operated 8.44 per cent more car-miles. The gross earnings from operation increased 5.65 per cent, forming 40.9 per cent of the total for the company, and the net earnings decreased 6.10 per cent and were 23.4 per cent of the total for the company. The decrease in net earnings compared with 1924 is due largely to the increase in car mileage required by the track extensions over which operation was begun late in 1924 and early in 1925, where the traffic has not yet had time to develop. These statements were contained in the annual report to the stockholders for the year ended Dec. 31, 1925.

The number of passengers carried in 1925 was greater each month than in 1924. The gain in revenue, however, was more than offset by the cost of additional car-miles operated plus the increase in wages of car, shop and trade employees. More attention was given to the regulation of street traffic by the police, and the number of collisions, although somewhat reduced, 829 compared with 957 in 1924, was still an evidence of the difficulties of operation in the crowded streets of the business districts, where nearly all the collisions occur.

The main line was increased by 1.66 miles of single track, the yards by 0.4 mile, and 1.95 miles of existing track was reconstructed. These track extensions, together with those completed in 1923 and 1924, brought about an increase in traffic which has necessitated the additional equipment. Seventy-three new model passenger cars were built, equipped and put in service, 24 old type cars were retired and dismantled and the bodies were scrapped, but all

Conspectus of Indexes for June, 1926

Compiled for Publication in This Paper by
ALBERT S. RICHEY
Electric Railway Engineer, Worcester, Mass.

	Latest	Month Ago	Year Ago	Since War High	Since War Low
Street Railway Fares* 1913 = 4.84	June 1926 **7.37**	May 1926 **7.36**	June 1925 **7.27**	June 1926 **7.37**	May 1923 **6.88**
Electric Railway Materials* 1913 = 100	June 1926 **154.4**	May 1926 **153.1**	June 1925 **152.4**	Sept. 1920 **247.5**	Oct. 1924 **148.5**
Electric Railway Wages* 1913 = 100	June 1926 **225.5**	May 1926 **225.4**	June 1925 **222.4**	Sept. 1920 **232.0**	March 1923 **206.8**
Am. Elec. Ry. Assn. Construction Cost (Elec. Ry.) 1913 = 100	June 1926 **201.9**	May 1926 **202.4**	June 1925 **200.0**	July 1920 **256.4**	May 1922 **167.4**
Eng. News-Record Construction Cost (General) 1913 = 100	June 1926 **204.8**	May 1926 **207.3**	June 1925 **204.6**	June 1920 **273.8**	Mar. 1922 **162.0**
U. S. Bur. Lab. Stat. Wholesale Commodities 1913 = 100	May 1926 **151.7**	April 1926 **151.1**	May 1925 **155.2**	May 1920 **246.7**	Jan. 1922 **138.3**
Bradstreet Wholesale Commodities 1913 = 9.21	June 1 1926 **12.80**	May 1 1926 **12.86**	June 1 1925 **13.62**	Feb. 1 1920 **20.87**	June 1 1921 **10.62**
U. S. Bur. Lab. Stat. Retail Food 1913 = 100	May 1926 **161.1**	April 1926 **162.4**	May 1925 **151.6**	July 1920 **219.2**	Mar. 1922 **138.7**
Nat. Ind. Conf. Bd. Cost of Living 1914 = 100	May 1926 **167.8**	April 1926 **168.4**	May 1925 **165.3**	July 1920 **204.5**	Aug. 1922 **154.5**
Steel Unfilled Orders (Million Tons) 1913 = 5.91	May 31 1926 **3.649**	Apr. 30 1926 **3.868**	May 31 1925 **4.050**	July 31 1920 **11.118**	July 31 1924 **3.187**
Bank Clearings Outside N. Y. City (Billions)	May 1926 **18.17**	April 1926 **18.65**	May 1925 **17.21**	Oct. 1925 **20.47**	Feb. 1922 **10.65**
Business Failures Number	May 1926 **1640**	April 1926 **1743**	May 1925 **1572**	Jan. 1924 **2231**	Aug. 1925 **1353**
Liabilities (Millions)	**32 61**	**47.34**	**39.75**	**122.95**	**27.22**

*The three index numbers marked with an asterisk are computed by Mr. Richey, as follows: Fares index is average street railway fare in all United States cities with a population of 50,000 or over except New York City, and weighted according to population. Street Railway Materials index is relative average price of materials (including fuel) used in street railway operation and maintenance, weighted according to average use of such materials. Wages index is relative average maximum hourly wage of motormen, conductors and operators on 137 of the largest street and interurban railways operated in the United States, weighted according to the number of such men employed on these roads. Previously the wage index applied to 144 railways. The change is due to dropping some roads where the number of trainmen has been reduced to a total of less than 100.

STATISTICS OF ELECTRIC RAILWAY SERVICE, HAVANA ELECTRIC RAILWAY, LIGHT & POWER COMPANY

	1924	1925
Kilowatt-hours used	34,139,235	38,485,913
Total number of passengers carried	114,872,616	121,625,500
Passenger car-miles	18,028,046	19,550,302
Passenger earnings	$5,743,630	$6,081,275
Passenger earnings per car-mile	$0.3186	$0.3111
Gross earnings from operation	$5,924,606	$6,259,208
Operating expenses and taxes	$4,120,948	$4,565,601
Net earnings from operation	$1,803,657	$1,693,606
Operating expenses and taxes per car-mile	$0.2285	$0.2335
Operating ratio, per cent	69.56	72.94

STATEMENT OF OPERATION OF THE RAILWAY DIVISION FOR THE YEAR ENDED DEC. 31, 1925, HAVANA ELECTRIC RAILWAY, LIGHT & POWER COMPANY

Earnings:		
Cars	$6,185,647	
Miscellaneous	73,560	
Gross earnings		$6,259,208
Operating Expenses and Taxes:		
Maintenance	$859,984	
Transportation	3,128,492	
General, including taxes	577,124	
Total operating expenses and taxes		4,565,601
Net earnings from operation for 1925		$1,693,606
Deductions for Division:		
Interest	$585,265	
Reserved for depreciation and contingencies	622,065	
Total		1,207,330
Net income for the division for 1925		$486,275

of the equipments and fittings worth salvaging were repaired for use again. The net gain was 49 new cars.

The fourteenth annual report of the Havana company includes the report of the general manager for 1925, as well as a statement of Warren Bicknell, consulting engineer to Frank Steinhart, president of the Havana properties. The accompanying table shows the statistics of the electric railway department in 1925 compared with 1924.

Alton Properties Sold Under Foreclosure

All properties of the Alton, Granite & St. Louis Traction Company and Alton Gas & Electric Company were sold under foreclosure at the Madison County Court House in Edwardsville, Ill., on June 16. The properties were sold in five parcels and brought a total of $1,965,000. The only bidder at the sale was Louis H. Egan, president of the Union Electric Light & Power Company, St. Louis, a member of the bondholders' committee. The other committee members are F. J. Boehm, St. Louis, and Allen Van Wych, New York City. Like the property sold at auction, the Union Electric Light & Power Company is controlled by the North American Company. The latter company controlled the Alton, Granite & St. Louis Traction Company and the Alton Gas & Electric Company through the East St. Louis & Suburban Railway, another of its subsidiaries. It is understood that the bondholders plan to reorganize the properties into three companies, each to be operated separately.

The sale was held by Louis Clements, Danville, Ill., special master of the United States District Court for the Eastern District of Illinois, under an order issued by Judge Lindley on a petition of the trustee for the bondholders. The companies had not paid interest on the $3,500,000 bond issue since February, 1920. The Alton, Granite & St. Louis Traction Company's interurban lines between St. Louis and Alton brought $700,000 and the city lines in Alton, Venice and Brooklyn, $180,000. The railway has been in receivership since 1920. T. W. Gregory, East St. Louis, was receiver.

Net Income Higher.—The total operating revenues of the Brooklyn-Manhattan Transit Corporation, Brooklyn, N. Y., for the eleven months ended May 31, 1926, was $40,974,038 against $39,550,536 for a similar period in 1925. Total operating expenses increased from $25,930,098 to $26,657,437. After the consideration of income deductions, a net income remained of $5,221,837 in the 1926 period and $4,643,080 in the 1925 period.

Reports Indicate Ohio Traffic.—City and suburban electric railways in Ohio in 1925 carried 871,509,382 passengers, according to a compilation of annual reports submitted to the Ohio Public Utilities Commission. This compilation shows that the total revenue of 110 interurban lines and sixteen city lines in the state was $65,405,795. The operating expenses of these companies aggregated $55,439,846, in addition to taxes of $6,098,010. The estimated investment of electric railway property alone, excepting the property not used for electric railway purposes in the case of dual service companies, was $316,035,385 as of Jan. 1, 1926. The total mileage operated in the state in 1925 was 3,038.

Deficit in Toledo.—A deficit of $14,960 resulted from May operations of the Community Traction Company at Toledo, Ohio, in spite of a better average daily business than in May of last year. The company carried 4,178,773 revenue passengers, collecting $292,037 passenger revenue, compared with $286,904 for May, 1925. Operating charges were $225,204, or $6,751 increase over May a year ago, while there was a loss of revenue from interurban track rentals. Feeder bus lines of the traction company carried 55,368 passengers. Revenue was $2,013 and cost of service $3,685. The Oak Street line operated at only a slight profit.

New Director Fills Vacancy.—Alfred F. Pillsbury, treasurer of the Pillsbury Flour Mills Company, Minneapolis, has been elected director of the Twin City Rapid Transit Company, Minneapolis, Minn., succeeding the late E. Pennington, chairman of the board of the Minneapolis, St. Paul & Sault Ste. Marie Railroad.

Taxpayers Pay in Seattle.—An assertion that the failure of Seattle, Wash., to rehabilitate its Municipal Railway system by "rapid transit" is adding about 10 per cent to the taxpayers' bill is made by William Pitt Trimble, chairman of the rapid transit committee of the Seattle City Planning Commission. Mr. Trimble presents figures to show that if the Stone & Webster interests now operated the lines their franchise tax would be $120,000 a year, which, with other costs placed on the taxpayer, brings the figure up to $650,000 a year. "Figured at this rate for the seven years the city has owned the lines," Mr. Trimble said, "the taxpayers have assumed a total burden of $4,500,000. The lines have paid Stone & Webster $4,200,000 on the principal, so the taxpayers have paid $300,000 more than the lines have paid Stone & Webster.

Trustees Appointed to Sell Property.—Walter C. Capper and J. Elmer Carter, Cumberland attorneys, were appointed on June 17 trustees to sell the property of the Cumberland & Westernport Electric Railway, Frostburg, Md., by Judge William C. Walsh of the Circuit Court. The order was made on a petition signed by the Real Estate & Trust Company, Philadelphia, which alleged that the company defaulted in payment of interest and principal on the $660,000 bonds secured by a mortgage on the property. The defendants to the suit admitted the allegation and the road will be offered for sale as three separate companies and also as a whole. The road, which operates 21 miles, went into the hands of a receiver on June 29, 1925. Reference to the receivership was made in ELECTRIC RAILWAY JOURNAL, issue of July 11, page 73.

Invitation to Purchase Additional Shares.—The reorganization committee for the United Railways of St. Louis, Mo., in connection with subscription receipts for common stock of the St. Louis Public Service Company, which are now being traded in on the St. Louis Stock Exchange, notices of which are now being mailed out to holders of record June 15, 1926, invites the holders to purchase on or before July 1, 1926, at $12.50 per share such additional shares as have not been subscribed by holders of certificates of deposit for the St. Louis Transit Company's 5 per cent bond. The right to purchase additional shares is on the basis of one-tenth of one share for each 1½ shares represented by the subscription receipts.

Sale Approved.—The Public Service Commission of New Hampshire has approved the sale of the Laconia Street Railway, Laconia, N. H., to Guy Tetley and Howard Byse. The owners were also given permission on their recent petition to issue capital stock to themselves to the amount of $25,000, which represents the railway's capitalization. Reference to the new ownership of the property was made in the ELECTRIC RAILWAY JOURNAL, issue of May 29, 1926, page 948.

South Shore Line Petitions for Equipment Certificate Approval.—Approval of an issue of equipment trust certificates in the principal amount of $1,060,000 as part of the plan of financing the purchase of 43 new cars and locomotives has been asked in a petition filed with the Indiana Public Service Commission by the Chicago, South Shore & South Bend Railroad, Michigan City, Ind. The equipment, which was ordered last year at a cost of $1,333,787, consists of two dining cars, two parlor cars, 35 electric motor cars for passenger and baggage service and four 80-ton Westinghouse electric locomotives.

Personal Items

J. K. Buchanan Resigns

J. K. Buchanan, vice-president and general manager of the West Virginia Utilities Company and the Wheeling Public Service Company, of Morgantown and Wheeling, W. Va., resigned recently. The resignation was announced from the office of the Southern Cities Utilities Company, parent organization.

Mr. Buchanan has been identified with the Wheeling concern since April, 1904, when he entered the employ of the Union Utilities Company, then directed by Harry Warfield as executive officer. The Union Utilities Company then became the West Virginia Traction & Electric Company, at which time its ownership passed into the hands of Eastern interests. During the war-time period there was a receivership, but this was lifted on April 1, 1920, and the property, along with that of Wheeling, was purchased in 1921 by Anderson & Company, Providence, R. I. Mr. Buchanan rose steadily in the ranks until he reached the position of general superintendent, which he held up to 1925, when he was elected vice-president and general manager. The Morgantown properties of the West Virginia Utilities Company are conservatively valued at $4,000,000. The Wheeling properties are estimated at $3,000,000.

Northern Ohio Changes Announced

Howard L. Farmer, veteran trainman in the employ of the Northern Ohio Power & Light Company, has been made superintendent of the Canton and Massillon city divisions and of the interurban division south of Akron. He succeeds Frank J. Conklin, who has held the position for the last seven years. Mr. Conklin goes into the freight department.

Charles Stottler, who has had charge of the Massillon shops for ten years, has resigned. He is succeeded by Harry Bucher, formerly of the Dover shops of the company.

W. A. Carlisle has been put in charge of a branch office in New York City of the Georgia Railway & Power Company, Atlanta, Ga., organized as part of the campaign to bring new industries to Georgia. Mr. Carlisle is personally familiar with conditions of interest to industrialists in the section served by the company. In addition to distributing literature and answering inquiries at the Eastern headquarters, Mr. Carlisle is personally calling on executives of various industries in the East in an effort to attract more factories to Georgia.

J. R. Dew has been made division passenger and freight agent of the Union Traction Company of Indiana in the territory comprising the cities of Marion, Kokomo, Logansport, Peru, Wabash, Tipton, Elwood and Noblesville, with his headquarters at Kokomo. The appointment is in line with the company's policy to provide service and counsel to all shippers and travelers who desire it. With the rapid extension of the first, second and third morning deliveries to points in Indiana, Ohio and Michigan and the addition of bus service to interurban passenger service the need has become acute for intensifying the various contacts maintained between the company and the public.

C. C. Gillette Promoted

C. C. Gillette, research manager of the Pittsburgh Railways, Pittsburgh, Pa., has been named vice-president and general manager in charge of operation of the Wheeling Public Service Company, Wheeling, W. Va. This announcement, emanating from the office of the Southern Cities Utilities Company, parent organization. Mr. Gillette



C. C. Gillette

succeeds J. K. Buchanan. He has already assumed charge of the Wheeling properties.

Mr. Gillette has been identified with the Pittsburgh property since September, 1921, when he became a special investigator for the Pittsburgh Railways. He was made traffic agent in the commercial department in 1923 and held this position up to the time of his appointment as research manager in 1925. Before his affiliation with the Pittsburgh Railways Mr. Gillette was associated with the Westinghouse Electric & Manufacturing Company. With that company he took the graduate students' apprentice course and special engineering course under B. G. Lamme. He also worked one year in the railway project section of the general engineering department. In May, 1917, he entered the military service and was connected with the Fourth Infantry, Third Division, as a first lieutenant and captain from September, 1917, to December, 1919. Mr. Gillette is a graduate of Bucknell University with the degree of electrical engineer. He was born in Rochester, N. Y., in 1895.

The new vice-president had the honor of being one of the four especially resourceful young men who were appointed to posts at the time of the creation of a commercial department on the Pittsburgh Railways, following the reorganization of that property. Mr. Gillette as traffic agent, J. E. Davis as special investigator, F. R. Cogswell as director of traffic promotion and J. B. Donnelly as director of public relations were all chosen to have a hand in the destiny of the newly-resurrected property because of their technical training and because temperamentally they were considered fitting overseers of such assignments.

George D. Wilcox, automotive engineer of the Department of Street Railways at Detroit, Mich., has resigned, effective July 3. Mr. Wilcox was engaged in work in connection with mechanical developments in the automotive department of the municipal system. The type of bus which the Street Railway Department recently contracted to purchase was designed by Mr. Wilcox and the specifications were drawn under his direction.

Clarence M. Lewis has been appointed counsel to the New York Transit Commission, effective July 1, to succeed General Louis W. Stotesbury, resigned. The salary is $15,000. The appointment of Mr. Lewis was announced by John F. Gilchrist, chairman of the commission. The new counsel was educated in the public schools of New York, at the College of the City of New York and the New York Law School. He was admitted to the bar in 1903.

W. T. Young, general manager of the Dundee Corporation Tramways of Scotland, has been appointed general manager of the Halifax Corporation Tramways of England. In this capacity he succeeds B. Hall, who has been appointed to a similar position in Portsmouth. During the past 27 years Mr. Young has held important posts in a number of British municipal tramway undertakings.

George A. Prichard, an attorney for many years in the train service of the Los Angeles Railway, Los Angeles, Cal., has been designated special legal adviser for employees requiring such service. Except when trials in court are necessary this advice and service, like preparing papers, such as deeds, mortgages and contracts, will be given without charge to employees. In matters involving purely domestic affairs and relations with the police traffic department, such as traffic violations, employees of the transportation department may continue to call upon that department, which will assign the cases to the special counsel if it be found advisable or necessary to do so.

Oakley Baskin has been appointed superintendent of power and lines of the International Railway, Buffalo, N. Y., according to announcement made by Bernard J. Yungbluth, president of the company. In this capacity he succeeds Joseph Mack. Mr. Baskin became affiliated with the International Railway in 1911 as assistant electrical engineer. He formerly was with the Flint Electrical Company as manager and also has been associated with the Astoria Electrical & Power Company,

Astoria, and the departments of maintenance and testing of the General Electric Company, Schenectady. He is a graduate of Pratt Institute.

Obituary

John E. Duffy

John E. Duffy, general superintendent of the New York State Railways in Syracuse, Utica and Oneida, died at his home in Syracuse at the age of 65. His death followed a long illness. He had not been at his office since February.

Mr. Duffy was one of the best-known railway men in the East. He had been connected with the New York State Railways for the last 33 years.

He was born at Herkimer, and went to Syracuse with his parents in 1873. He was educated in the public schools and in 1879 began work as an apprentice in a shoe factory. He stayed at that trade for fourteen years. He was appointed a conductor on the Syracuse Consolidated Railway in 1893. At that time there were several competing lines in Syracuse. In 1896 he was made an inspector, and a year later was appointed night foreman at the Tallman Street shops of the People's Line.



John E. Duffy

In 1898 he became inspector again and in 1899 was made day foreman. In June, 1900, he became chief inspector of all lines of the newly consolidated companies. The following October he was placed in charge of the transportation department and a year later was appointed superintendent of the Syracuse lines, New York State Railways.

Eleven years later he was promoted to the general superintendency of the Syracuse, Utica and Oneida lines.

Bernord D. Booker, an attorney in the legal department of the Philadelphia Rapid Transit Company, Philadelphia, Pa., died recently in the Casualty Hospital, Washington, following an automobile acident in Riverdale, Md. Mr. Booker was graduated from the University of Virginia in 1919 and afterward was admitted to the Pennsylvania bar. He became associated with the Philadelphia Rapid Transit Company in 1922. He was 31 years old.

Manufactures and the Markets

News of and for Manufacturers—Market and Trade Conditions
A Department Open to Railways and Manufacturers
for Discussion of Manufacturing and Sales Matters

Cars in Outdoor Space

Comprehensive Street Car Exhibit Planned for Cleveland, Exemplifying Every Modern Type for All Kinds of Service

Extraordinary facilities are to be provided at Cleveland for cheaply and conveniently exhibiting street cars. This will permit probably the most gigantic and spectacular street car display ever held in the world. These facilities will be available as a result of arrangements made with the Cleveland Railway and the official drayman for handling cars received from the steam railways and the interurban railway track connections.

John J. Stanley, president of the Cleveland Railway, has addressed a communication to railway operators and manufacturers asking that 100 cars be displayed. The manufacturers will exhibit the latest cars, both city and interurban, which they are building today. The operators will exhibit cars now running which represent the developments of the last few years. It is expected that there will be a complete display of every modern type of city and interurban car, with all the variations in car body design, trucks and accessory equipment to meet varying service requirements. This one feature alone of the exhibit will be well worth careful study by railway men. To the public at large it will afford a convincing demonstration of the way in which electric railways are meeting changed conditions in the transportation field and serve as proof that as a vehicle for rapid, safe and comfortable transportation service the modern electric street car cannot be surpassed.

If the committee's plans are successful, one of the association's newly designed standard cars developed during the year by the special manufacturers' committee and built by one of the member companies will be on view. Among other exhibits, it is hoped that there will be one of the new streamline body cars. This car will illustrate the results of efforts to enhance the architectural grace and proportions in body design. In addition there will be standard one-man cars, double-truck one-man, two-man cars of the center entrance and exit type, cars for heavy rush-hour traffic and lighter cars for supplemental service; in other words, big cars and little cars, for various kinds of city service. In the interurban field exhibits of recent designs in heavy Pullman type cars intended for operation at 75 to 80 m.p.h. are being planned. Contrasting with these will be the light-weight simplified types for speeds up to 50 m.p.h., and still further, the lighter weight one-man type of interurban car; special interurban cars, including the latest developments in interurban sleepers, and dining cars.

In the work car class, all types of dump cars, crane cars and other types of work cars will be exhibited.

Closely allied with the car exhibit will be a display of heavy track machinery and tools. Among these, the committee plans to secure sweepers, snow plows, concrete breakers, car wheel trucks and tractor devices, track digging plows, earth borers, tie tampers and other maintenance of way tools. The facilities to be provided at the convention will permit many of these to be put in actual operation so that their effectiveness can be demonstrated.

To date association headquarters has received requests from 144 exhibitors for 68,693 sq.ft. of space, not including track space, for which applications have been received for more than 500 linear feet.

Twin City Company Is Testing Gas-Electric Buses

Tests of two makes of gas-electric buses are being conducted by the Twin City Rapid Transit Company, Minneapolis, Minn., and the Northland Transportation Company, bus subsidiary of the Great Northern Railroad. These buses, furnished by the International Motor Company and the Yellow Truck & Coach Manufacturing Company, are said to be practically noiseless in operation and are equipped with electric brakes for hill braking and emergency stops. It is planned by the Twin City Rapid Transit Company to operate gas-electric buses on its proposed Nicollet-Hennepin bus line in Minneapolis. T. Julian McGill, vice-president of the company, said:

> The new type of gasoline-electric bus is as noiseless as possible, and that is of great importance when operating bus service through the residential districts. This type is particularly desirable for service on Nicollet Avenue. Actual bus operation probably will begin in September of this year.

Much Interest Shown in Gas-Electric Rail Cars

Four additional railroads have recently ordered gas-electric rail cars from the J. G. Brill and Westinghouse Electric & Manufacturing companies. The contracts as placed by the respective roads include four 71-ft. combination baggage and passenger cars for the Lehigh Valley, two standard 60-ft. cars for the Central of Vermont, two standard 60-ft. cars for the Pennsylvania Railroad and four 60-ft. cars for the St. Louis & San Francisco. The first named four cars, however, instead of the standard 250-hp. gas-electric generator units, will be equipped with double units giving each car a total of 500 hp. This will make them the heaviest engined passenger gas-electric cars ever built anywhere in the world.

American Car Earnings Hold Steady

President Woodin Reviews Affairs in Annual Report and Discusses Entrance Into Bus Building Field

Lament is expressed by W. H. Woodin, president of the American Car & Foundry Company, New York, at the volume of new equipment buying by the railroads during the fiscal year of that company ended June 30, 1926. Such buying was not in the volume that reasonably might have been expected. Export business was good; in fact, much better than the year before, and in the manufacture and sale of miscellaneous products the company did a business satisfactory both as to quantity and profit. The year closed with a fair amount of business booked, and he sees no reason to complain with respect to the share of business obtained by the company.

Net earnings of the company and its subsidiaries in the fiscal year ended April 30, 1926, were $6,102,898, equivalent, after preferred dividends, to $6.67 a share on 600,000 shares of common stock. This compares with $6,164,104, or $6.77 a share, in the preceding twelve months.

Total earnings in the last fiscal year were $9,274,572. After allowing $3,171,674 for renewals, replacements, etc., dividends of $2,100,000 on 7 per cent preferred stock and $3,600,000 dividends on common stock, a surplus of $402,898 is shown. This brings the consolidated surplus as of April 30, 1926, up to $41,245,296.

Of particular interest to readers of the ELECTRIC RAILWAY JOURNAL are the remarks by Mr. Woodin about the entrance of the company into the bus, truck and electric railway fields. He says that the management for some time past has been giving careful study to the problems in transportation both of passengers and of freight presented by the growing use by the electric and steam railroads of automotive vehicles, including buses, motor trucks and motor-driven rail cars—vehicles which have demonstrated their value in service supplementary to that of many street and interurban electric railways and for use by branch lines of steam railways where under present day costs the available traffic has not been sufficient to permit of profitable operation by the older methods. As Mr. Woodin sees it, these vehicles unquestionably will play an increasingly important part as factors in the improvement of the railway earnings.

Recognizing these conditions, the management concluded some time ago that in the manufacture and marketing of such automotive equipment there lay a legitimate and profitable field for an extension of the company's activities and during the year just closed it entered that field by the organization of American Car & Foundry Motors Company and the acquisition of a controlling interest in the newly organized Brill Corporation.

In commenting on the general conditions Mr. Woodin said in part:

> The railroad buying of new equipment during the year has been done spasmodically and at prices that have made a profit possible only by keeping costs to a minimum, this calling for the practice of the utmost economy and efficiency in all departments of the company's activities.
>
> The railroads generally are in good financial condition. There is hanging over them no threat of legislation adversely affecting their interests. Undoubtedly there is need of additional equipment if they are to discharge adequately their functions as carriers of the products of the country's industry. These conditions justify the expectation of increased buying activity, and when that comes there is no reason to doubt that the company will get its fair share of the business.
>
> There has been a very noticeable and progressive lessening of the volume of business done in the rebuilding and repairing of old equipment. This is due in part to a more or less insistent demand that the railroads should in their own shops rebuild and repair their worn equipment. Such demand is not justified on the score of cost.

The consolidated income account compares:

	1926	1925
Earnings	$9,274,572	$9,781,085
Renewal and replacement*	3,171,675	3,616,982
Net income	$6,102,897	$6,164,103
Preferred dividends	2,100,000	2,100,000
Common dividends	3,600,000	3,600,000
Surplus	$402,897	$464,103
Previous surplus	40,842,399	37,278,466
Profit and loss surplus	$41,245,296	$37,742,569

*Repairs, new patents, flasks, etc.

Ten New Cars Ordered by Suburban Road

New York, Westchester & Boston Railway, New York, N. Y., has ordered ten additional electrically equipped passenger cars. The new units will be built by the Pressed Steel Car Company, Pittsburgh, Pa., and the electrical equipment supplied by the Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa. Installation of the electrical equipment will be made at the Harlem shops of the New York, Westchester & Boston Railway.

The cars will cost approximately $450,000 and are being provided to accommodate a rapidly increasing burden of traffic which during the first five months of 1926 has gained nearly 14 per cent over a similar period in 1925, and promises to reach a total of 11,500,000 for the current year, according to Leverett S. Miller, president of the road. The cars will be 72 ft. in length, weigh 66 tons, and seat 80 passengers. Each car will have the "dead man control" feature. Two 340-hp. motors are provided per car and the overhead pantograph feeder system will be used for current collection. The six entrances of each car will be of electro-pneumatic operation. The ventilating system will be of the Garland high-speed vacuum type.

Inasmuch as the New York, Westchester & Boston passenger schedule was recently revised to provide twenty additional trains daily, making a total of 245, there will be no immediate further addition. The new cars will be used in lengthening trains already scheduled, according to Mr. Miller. He indicated that further orders for passenger car equipment might become necessary by fall of this year, when an extension from Mamaroneck to Harrison, N. Y., now under construction is to be completed.

Metal, Coal and Material Prices

Metals—New York	June 22, 1926
Copper, electrolytic, cents per lb	13.95
Copper wire, cents per lb	16.00
Lead, cents per lb	8.25
Zinc, cents per lb	7.46
Tin, Straits, cents per lb	61.50
Bituminous Coal f.o.b. Mines	
Smokeless mine run, f.o.b. vessel, Hampton Roads, gross tons	$4.25
Somerset mine run, Boston, net tons	1.925
Pittsburgh mine run, Pittsburgh, net tons	1.75
Franklin, Ill., screenings, Chicago, net tons	1.80
Central, Ill., screenings, Chicago, net tons	1.575
Kansas screenings, Kansas City, net tons	2.425
Materials	
Rubber-covered wire, N. Y., No. 14, per 1,000 ft	$6.25
Weatherproof wire base, N. Y., cents per lb	18.00
Cement, Chicago net prices, without bags	2.10
Linseed oil (5-bbl. lots), N. Y., cents per lb.	11.70
White lead in oil (100-lb. keg), N. Y., cents per lb	15.00
Turpentine (bbl. lots), N. Y., per gal	$0.89

Italian Engineers Study American Railroad Electrification

Following the meetings of the International Electrotechnical Commission, a commission consisting of several engineers from the Italian State Railways who are interested in railroad electrification availed themselves of the opportunity to study American electrified systems. Included were Oresti Jacobini, manager of electrification in Italy; Guiseppe Bianchi, in charge of electric locomotive investigations; Enea Virgili, in charge of overhead transmission and substations; Gino Minucciani, in charge of operation investigations, and Eugenio Dupré of the electrification office in Rome. Accompanying them were Ugo Ferella of the Compagnia Generale di Elettricita of Milan, Italy, and J. J. Linebaugh of the railway engineering department of the General Electric Company.

Among the electrified railroads inspected were the Chicago, Milwaukee & St. Paul and the Butte, Anaconda & Pacific Railway. In addition, Mr. Bianchi spent three days inspecting the shops and test tracks of the General Electric Company at Erie, Pa., where most of this company's railway apparatus is built and tested. Several types of locomotives were being assembled at the time, including oil-electrics, the new motor-generator type for the New York, New Haven & Hartford and the New York Central gearless passenger locomotives.

In addition, the commission visited the Schenectady plant of the General Electric Company. F. C. Pratt, vice-president of the General Electric Company in charge of engineering and manufacturing; G. Faccioli, works engineer of the company at Pittsfield, Mass., and Mr. Jacobini of the commission were speakers at a dinner in Schenectady given by the International General Electric Company in honor of the visitors.

Bus Exports in 1925 Showed Big Increase

Exports of 58,624 automobile trucks and buses, valued at $37,703,302, were made from the United States in 1925, as compared with 27,332 units, valued at $19,199,344, in the preceding year. This showed an increase of more than

100 per cent, while the domestic production increased by only 32 per cent, from 360,625 in 1924 to 475,941 in 1925, according to the Automotive Division of the Department of Commerce.

New Haven to Receive Newest Type of Electric Locomotive

The first of the new type electric locomotives for the New York, New Haven & Hartford Railroad has been shipped from the Erie Works of the General Electric Company. The locomotive is one which combines the economic advantages of both alternating and direct current—alternating current for transmission and distribution and direct current for operation of the traction motors. Power is received from a single-phase trolley and reduced from 11,000 volts and 25 cycles to direct current at 600 volts.

The new type locomotive is a joint product of the American Locomotive and General Electric Companies. The New York, New Haven & Hartford Railroad is obtaining seven of them, five for freight service on the main line between Oak Point and New Haven and two for switching purposes in general yard service. When double-heading, these locomotives will function in multiple with the present single-phase locomotives. A preliminary description of these locomotives was published in the ELECTRIC RAILWAY JOURNAL, issue of Oct. 18, 1924, page 705. The present units differ from this description only in the matters of over-all length, which is 53 ft. 2 in., and rigid wheelbase, which is 8 ft. 3 in.



New Haven Has Placed Newest Electric Locomotive in Service

Yellow Truck Earnings for Second Quarter May Break Record

Net earnings of the Yellow Truck & Coach Manufacturing Company, Chicago, Ill., for the quarter ended March 31, 1926, were $209,966 in excess of dividend requirements, according to a statement issued on June 14 by John A. Richey, president. Net profits available for dividends amounted to $580,466. The showing made during April and May, together with orders on the books for June, indicates the second quarter will be the greatest in the company's history.

Francis Hodgkinson and A. D. Hunt Honored

Slightly more than a year after he was awarded the Elliot Cresson Gold Medal by the Franklin Institute in recognition of his scientific achievements, Francis Hodgkinson, for many years chief engineer of the South Philadelphia Works, Westinghouse Electric & Manufacturing Company, was appointed consulting mechanical engineer for the organization as a whole, taking effect on June 7. Simultaneously an order discontinuing the position of chief engineer of the South Philadelphia Works and creating instead the position of manager of engineering was announced. Appointed to the new position is A. D. Hunt, well known in engineering circles and for many years a member of the engineering staffs of the Westinghouse organization.

Mr. Hodgkinson's prime duty will be to act as consulting engineer in all design problems and other engineering activities at South Philadelphia. During his noteworthy career he was associated with the Chilean Navy, the telephone company and electric light company at Lima, Peru, and C. A. Parsons & Company, the famous turbine designers and builders. When, in 1896, the Westinghouse Machine Company acquired the American rights for the manufacture of the Parsons type turbines, Mr. Hodgkinson, upon the recommendation of Sir Charles Parsons, became connected with the Westinghouse Machine Company, which subsequently became the turbine building section of the Westinghouse Electric & Manufacturing Company.

In 1916 he was made chief engineer of the South Philadelphia Works, being advanced to his present position exactly ten years later.

A. D. Hunt, the new manager of engineering, has been connected with the Westinghouse company for a number of years, occupying the position of manager of steam service at the South Philadelphia Works. Mr. Hunt was graduated from Cornell University in 1905 with the degree of mechanical engineer. Later the same year, he joined Westinghouse, Church, Kerr & Company in an engineering capacity, and eventually joined the Westinghouse Electric & Manufacturing Company, being assigned to the South Philadelphia Works in September, 1919, in the marine service section. He remained in that capacity until Jan. 1, 1920, when he was appointed manager of steam service. He was born in Tarrytown, N. Y.

Buses Ordered in Seattle—Cars Will Be Purchased Soon

It would appear that the long-deferred action in the matter of buses and street cars for the Municipal Street Railway, Seattle, Wash., is at last coming to a head. The city purchasing agent has issued an official call for bids on 80 light-weight street cars of the front-entrance, center-exit type, with a seating capacity of 58 passengers. In addition to this action, the City Council recently passed an ordinance appropriating $75,600 to purchase fourteen new buses for use on the Tenth Avenue Northeast Line to replace the privately-owned buses that are now operating.

The ordinance provided that five 21-passenger buses and two chassis will be bought from the Garford Motor Truck Company, two chassis from the White Company, and five Reo buses from the Lamping-McDonald Motor Company. For more than a year the City Council has been trying to reach an agreement as to what type of buses should be bought for this service. The bus manufacturers will take railway department warrants at par in payment.

Rolling Stock

San Francisco, Cal.—The Board of Public Works has been authorized to furnish and deliver fifteen street cars for the municipal railroad. The board is also authorized to approve plans and specifications for these cars.

Des Moines & Central Iowa Railway through its bus operating subsidiary, the Des Moines & Central Iowa Motor Transportation Company, has entered the field of bus operation with three Mack parlor car units, and is now operating an interurban service between Des Moines and Newton, Iowa, a distance of 30 miles. The three new units are equipped with Lang parlor car bodies mounted on Mack 230½-in. bus chassis.

Steubenville, East Liverpool & Beaver Valley Traction Company, East Liverpool, Ohio, is rebuilding fifteen center-entrance steel cars for use on the city lines in the East Liverpool and Steubenville districts, it was recently announced by C. S. Wills, general superintendent. The first of these cars has just been completed and is now in service. Among the improvements being made on the equipment are the addition of electric heating coils, double thickness flooring, and a new steel inner lining. The trucks have been rebuilt and extensive renewals made in the air brake equipment.

Municipal Railway of St. Petersburg, St. Petersburg, Fla., recently received eight X-21 city service buses from the Yellow Truck & Coach Manufacturing Company, Chicago, Ill. With these units bus operation was inaugurated by the St. Petersburg company, and on

June 4 hundreds of residents of the town accepted the invitation of Mayor Blanc for a free ride through the suburban part of the community. Beginning on June 8 five of the buses were placed in operation on the north side loop through Granada Terrace and Fourth Street. Two buses are providing service to the south side residents on Fourth Street South and Lakeview Avenue, while the eighth bus is being held in reserve.

Track and Line

New York, N. Y. — The Board of Transportation recently received seven bids for completing the Times Square station of the Queensboro subway extension, now under construction under 41st Street from the Fifth Avenue station at Bryant Park to Eighth Avenue. The informal totals of the bids were: M. F. Kelly Building Company, $179,708; Ascher Engineering Company, $180,357; Norman A. Desier, $197,000; John B. Roberts & Company, $199,000; D. C. Serber, Inc., $202,252; Werner-Mitchell Company, $205,000; Joseph Colon Construction Company, $218,809.

Chicago & West Towns Railway, Chicago, Ill., is rapidly pushing the reconstruction of its line on 52d Avenue, Cicero, between Roosevelt Road and 22d Street. New rails and ties are being laid and close to 1 mile of second track added. Grooved, city type rails will replace the former T-rail construction. The city of Cicero has announced its intention of completing the paving of that portion of the street which the company is not required to pave.

Minneapolis, Northfield & Southern Railway, Minneapolis, Minn., which operates gas-electric passenger trains and steam freight, will spend $1,500,000 in extension work, including 6 miles to connect with the Minneapolis, St. Paul & Sault Ste. Marie road between Golden Valley and Crystal. This will give that line direct connection with every steam road entering the city.

Power Houses, Shops and Buildings

Columbus Electric & Power Company, Columbus, Ga., has received a permit for the enlargement and remodeling of the carhouse at Seventeenth Street and Second Avenue. The cost of the work will be approximately $6,000.

Wisconsin Gas & Electric Company, Kenosha, Wis., has completed work on the construction of its new garage, costing approximately 80,000, which will provide more adequate facilities for its rapidly growing bus business.

Trade Notes

Trico Fuse Manufacturing Company, Milwaukee, Wis., has recently appointed J. T. Sudduth & Company, 229 Brown-Marx Building, Birmingham, Ala., as sales representatives for the states of Alabama and Georgia. F. J. Keller & Company, Fort Worth, are sales representatives for the state of Texas. The Coast Electric Supply Company, 222 South San Pedro Street, Los Angeles, is a new Trico sales representative for the state of California.

Botsfield Refractories Company, Philadelphia, Pa., manufacturer of Adamant fire brick, cement and refractory furnace lining, announces that the Standard Asbestos & Cork Company has been appointed distributor of Adamant fire brick cement in Tulsa, Okla.

Charles B. Phelps, Paterson, N. J., announces that he and Charles J. Schmid, his associate, have been appointed metropolitan New York and northern New Jersey representatives for the Uehling Instrument Company of Paterson, the Williams Gage Company of Pittsburgh, the Combustion Control Division of A. W. Cash Company of Decatur, Ill., and the National Boiler Protector Company of Dayton, Ohio. Mr. Phelps still retains his former connection with the Uehling company as treasurer. Mr. Schmid was formerly the Boston representative of the Uehling Instrument Company.

Sullivan Machinery Company, Chicago, Ill., announces the appointment of Charles B. Officer, hitherto assistant to the president on engineering matters, to the position of chief engineer of the company, in charge of engineering matters with regard to new machinery or changes in existing designs. Mr. Officer is a graduate of Yale University, from which he received his Bachelor of Science degree from Sheffield School in 1912 and his M.E. degree in 1915. He has been connected with the Sullivan company ever since his graduation.

Cecil R. Lambert Company, Inc., Detroit, Mich., specialists in the design, manufacture and installation of conveying and handling equipment, announces that in order to identify its products and service with its name, it has changed its name to Mechanical Handling Systems, Inc. The company's facilities for service are being increased by additions to its plant and personnel, but there is no change in ownership, management or executive staff.

The Burr Company, Champaign, Ill., sold its plant and other physical equipment at a master's sale to D. C. Dobbins and Mrs. E. B. Rothgeb, daughter of Ellis Burr, founder of the company, for $27,200. Patent rights and drawings on the dynamometer car, manufactured by the company, were taken by the Baldwin Locomotive Company for $15,000. This company will pay about 50 cents on the dollar to its creditors, it is reported.

A. Milton Buck has joined the sales force of the Bridgeport Brass Company, Bridgeport, Conn. Mr. Buck will have his headquarters in Washington, covering Washington, D. C., and the states of Maryland, Virginia and West Virginia. He will specialize on sales of Bridgeport-Keating flush valves and Plumrite brass pipe.

Chemical & Vacuum Machinery Company, Inc., Buffalo, N. Y., has acquired from the Judelson Evapo-Dryer Corporation, New York, N. Y., all rights to build and market exclusively the apparatus known as the Judelson Evapo-Dryer under process patent 1,527,193, dryer patent 1,527,192, and insulator patent 1,513,595.

Roller-Smith Company, New York, N. Y., announces that the states of Maryland, Virginia and North Carolina are now covered by C. R. Speaker, Evening Star Building, Washington, D. C. The former arrangement with W. A. McCombs & Company, Westinghouse Building, Pittsburgh, Pa., has been transferred to a newly-formed organization, the D.-B. Sales Engineering Company at the same address. The Tennessee Engineering & Sales Company, Knoxville, Tenn., has added to its territory the states of Georgia, Florida and South Carolina, which, together with eastern Tennessee, form the section in which it represents the Roller-Smith company.

Leon L. Wolf Waterproof Fabric Company, Cincinnati, distributor of Kemi-Suede, the waterproof material for roofs, upholstering, flooring and curtains, has elected B. A. Colker secretary. He succeeds Leon Lederer, who remains a member of the board. Mr. Colker has been associated with the company as sales manager and assistant to Leon L. Wolf, president, for some time.

New Advertising Literature

Crouse-Hinds Company, Syracuse, N. Y., has issued a novel folder which graphically illustrates the manner in which traffic conditions have increased in the past 30 years and suggests the use of Crouse-Hinds traffic signal installations to meet the present situation. On the inside of the folder is pictured a large map of the United States showing the cities where these traffic installations have been made.

The Alexander Milburn Company, Baltimore, Md., has issued a miniature catalog illustrating quite comprehensively the complete line of Milburn welding and cutting equipment. Copies of this booklet may be obtained from the company upon request.

Duff Manufacturing Company, Pittsburgh, Pa., has issued a new leaflet on the Duff pinion puller. This device has been developed in conjunction with the engineers of the Westinghouse Electric & Manufacturing Company particularly for use in repair shops and power houses. The manufacturer describes the Duff pinion puller as "the simplest, quickest and most positive tool ever developed for its purpose."

Spicer Manufacturing Corporation, South Plainfield, N. J., has issued bulletin No. 44, giving price lists on genuine Spicer parts for type G grease-lubricated joints. Information is also contained in the bulletin on correct lubrication of Spicer universal, together with suggestions for removing, repairing and assembling type G universal joints and propeller shafts.

Westinghouse Electric & Manufacturing Company, Pittsburgh, Pa., has released the first of a series of railway maintenance charts believed to be very interesting and helpful to maintenance men. The intention of the company is to get out these charts regularly. The first chart of the series covers armature and axle bearings. The second, to be released in about a month, will have for its subject armature insulation.



Put modern hand brakes on modern safety cars—

Many electric railway transportation systems need to replace thousands of obsolete cars with new light-weight types—in which safety is an all important factor. These companies can easily meet this equipment of safety in hand brakes by installing—

Peacock Staffless Brakes

Thoroughly up-to-date in every particular they can develop three times the braking capacity of ordinary hand brakes. Their 144-in. chain winding capacity insures adequate braking power even though brake shoes are worn and brake rigging is loose.

Minimum platform space, simplicity of operation, low installation costs and low maintenance costs are other factors that adapt Peacock Staffless Brakes to the newest light-weight safety cars.



The Peacock Staffless

**Ask for further facts and figures—
and for estimates on your installation.**

NATIONAL BRAKE CO., Inc.
890 Ellicott Sq., BUFFALO, N. Y.

Canadian Representatives:
Lyman Tube & Supply Company, Limited, Montreal, Canada

Bankers and Engineers

Ford, Bacon & Davis
Incorporated
Engineers
115 Broadway, New York
PHILADELPHIA CHICAGO SAN FRANCISCO

The J. G. White Engineering Corporation
Engineers—Constructors
Oil Refineries and Pipe Lines, Steam and Water Power Plants, Transmission Systems, Hotels, Apartments, Office and Industrial Buildings, Railroads.
43 Exchange Place New York

STONE & WEBSTER
Incorporated
EXAMINATIONS REPORTS APPRAISALS
ON
INDUSTRIAL AND PUBLIC SERVICE PROPERTIES
New York Boston Chicago

THE BEELER ORGANIZATION
ENGINEERS AND CONSULTANTS
Traction - Traffic - Equipment - Power Investigations
TRANSPORTATION, TRAFFIC, AND OPERATING SURVEYS
COORDINATING SERVICE—FINANCIAL REPORTS
APPRAISALS—MANAGEMENT
52 Vanderbilt Ave. New York

SANDERSON & PORTER
ENGINEERS
PUBLIC UTILITIES & INDUSTRIALS
Design Construction Management
Examinations Reports Valuations
CHICAGO NEW YORK SAN FRANCISCO

ENGELHARDT W. HOLST
Consulting Engineer
Appraisals Reports Rates Service Investigation
Studies on Financial and Physical Rehabilitation
Reorganization Operation Management
683 Atlantic Ave., BOSTON, MASS.

ALBERT S. RICHEY
ELECTRIC RAILWAY ENGINEER
WORCESTER, MASSACHUSETTS
REPORTS - APPRAISALS - RATES - OPERATION - SERVICE

KELKER, DeLEUW & CO.
CONSULTING ENGINEERS
REPORTS ON
Operating Problems Rates Traffic Surveys
111 W. Washington Street, Chicago, Ill.

C. B. BUCHANAN, President — W. H. PRICE, JR., Sec'y-Treas. — JOHN F. LAYNG, Vice-President
BUCHANAN & LAYNG CORPORATION
Engineering and Management, Construction, Financial Reports, Traffic Surveys and Equipment Maintenance
BALTIMORE, 1904 Citizens National Bank Bldg. — Phone: Hanover: 2142 — NEW YORK, 49 Wall Street

DAY & ZIMMERMANN, INC.
ENGINEERS
DESIGN - CONSTRUCTION - REPORTS
VALUATIONS - MANAGEMENT
NEW YORK PHILADELPHIA CHICAGO

HEMPHILL & WELLS
CONSULTING ENGINEERS
Gardner F. Wells Albert W. Hemphill
APPRAISALS
INVESTIGATIONS COVERING
Reorganization Management Operation Construction
43 Cedar Street, New York City

STEVENS & WOOD
INCORPORATED
ENGINEERS AND CONSTRUCTORS
120 BROADWAY, NEW YORK
ENGINEERING CONSTRUCTION — YOUNGSTOWN, O. — FINANCING MANAGEMENT

WALTER JACKSON
Consultant on Fares and Motor Buses
The Weekly and Sunday Pass—Differential Fares—Ride Selling
143 Crary Ave., Mt. Vernon, N. Y.

Transmission Line and Special Crossing Structures, Catenary Bridges
WRITE FOR OUR NEW DESCRIPTIVE CATALOG
ARCHBOLD-BRADY CO.
Engineers and Contractors SYRACUSE, N. Y.

Byllesby Engineering & Management Corporation
231 S. La Salle Street, Chicago
New York San Francisco

McCLELLAN & JUNKERSFELD
Incorporated
ENGINEERING AND CONSTRUCTION
Examinations—Reports—Valuations
Transportation Problems—Power Developments
68 Trinity Place, New York
CHICAGO ST. LOUIS

JAMES E. ALLISON & CO.
Consulting Engineers
Specializing in Utility Rate Cases and Reports to Bankers and Investors
1017 Olive St., St. Louis, Mo.

THE P. EDWARD WISH SERVICE
50 Church St. NEW YORK — *Street Railway Inspection* DETECTIVES — 131 State St. BOSTON

When writing the advertiser for information or prices, a mention of the Electric Railway Journal would be appreciated.

NAUGLE POLES
WESTERN & NORTHERN CEDAR
NAUGLE POLE & TIE CO.
59 E. MADISON ST. CHICAGO ILL.
New York · Columbus · Kansas City · Spokane · Vancouver · Boston

"Axle Specialist Since 1866"
Address all Mail to Post Office Box 515, Richmond, Va.
CAR AXLES
J. R. JOHNSON AND CO., INC.
FORGED STEEL AXLES
For Locomotives, Passenger, Freight and Electric Cars
Smooth Forged or Rough Turned—Carbon or Alloy Steel—Plain or Heat Treated, Forged and Turned Piston Rods, Crank Pins, Large Shafts, Round Bars, etc.

ROEBLING
WELDING CABLE
ELECTRICAL WIRES and CABLES
John A. Roebling's Sons Company, Trenton, N. J.

A Single Segment or a Complete Commutator
is turned out with equal care in our shops. The orders we fill differ only in magnitude; small orders command out utmost care and skill just as do large orders. CAMERON quality applies to every coil or segment that we can make, as well as to every commutator we built. That's why so many electric railway men rely absolutely on our name.
Cameron Electrical Mfg. Co., Ansonia, Connecticut

BRAZED Rail Bonds ARC WELD
ERICO
Portable Arc Welding Outfits
The Electric Railway Improvement Co.
Cleveland, Ohio

Northern CEDAR POLES Western
We guarantee
all grades of poles; also any butt-treating specifications
BELL LUMBER COMPANY
Minneapolis, Minn.

Shuler
Front
Axles



For:
TRUCKS
MOTOR BUSSES
TAXIS
TRACTORS
TRAILERS

We only broadcast about once a month—a short program at that.

Boiled down it can be relayed in 10 words:

SHULER makes FRONT AXLES ONLY—that's why they are superior.

Shuler Axle Co.
INCORPORATED
LOUISVILLE, KY.

Member of Motor Truck Industries, Inc., of America

"A"ssuring "B"etter "C"ontact

AN A. B. C. report is a businesslike, deciding authority that has replaced the old custom of buying space on certain "claims" of the publisher.

The publisher with space to sell submits the facts about his business in the form of a statement to the Audit Bureau of Circulations. This statement after it is checked, approved or audited by the Bureau is used to place the publisher's wares before the Advertiser who is buying space.

The Advertiser knowing the thoroughness of A.B.C. methods safely bases his decision on the Verified Facts contained in the A. B. C. report.

The Audit Bureau of Circulations has brought together the Buyer and Seller of Space upon a basis of Mutual Confidence.

The careful Advertiser knows that the purchase of Space by A. B. C. reports cuts out inflated Waste Circulation and saves money that would otherwise be lost in paying for unproductive space.

Study the latest A.B.C. report of Electric Railway Journal before placing your advertising. A copy will be furnished on request.



Cast Iron and Cast Advertising

Ordinary run-of-foundry iron will not work as well in brake shoes as a specially developed metal, melted for this purpose only, poured around a bundle of expanded steel, chilled at the ends and reinforced at the back. One is plain cast iron. The other is iron which has been definitely *organized* to do more and better work.

Railway men, therefore, do not expect as much from one form of brake shoe as from the other. Is it any more logical to expect similar results from two different forms of advertising?

Both equipment and public-relations advertising sometimes bear the stamp of an ordinary run-of-the-office job. In other instances the advertising clearly has been cast from especially selected words, poured around a bundle of experience, sharpened at the ends and reinforced with an attractive illustration or typography. It is advertising definitely *organized* to do more and better work.

Just as the specialist, moreover, casts a better brake shoe than the general jobbing foundry, the specialist in transportation advertising should accomplish the best work for the equipment manufacturers and railways. Transportation is a business unlike any other in existence. So is transportation advertising and the man who thinks that general advertising knowledge is all that is required in the advertising of a brake shoe is no closer to the truth than one who thinks he needs to know the brake shoe only.

We are not a general advertising agency which casts its metal in a hundred different moulds. The lighthouse trademark—symbol of our workmanship—appears exclusively on transportation literature. We hope that transportation men will learn to look for it and, while we are already serving quite a number of the prominent advertisers in this field, we would be glad to talk to all who feel that their advertising, like their brake shoes, might be organized to do more and better work.

Doyle, Kitchen & McCormick, Inc.
2 WEST 45th STREET, NEW YORK
An Advertising Agency



Everywhere—

The Gruss Twins are protecting buses from road shock and vibration.

Naturally this means less breakage—smaller repair bills—fewer lay-ups, increased patronage due to supreme comfort. 166% sales increase last year proves it!

THE CLEVELAND PNEUMATIC TOOL CO.
CLEVELAND, OHIO

GRUSS AIR SPRINGS

for Trucks, Buses Passenger Cars



The above relief map of Yellowstone National Park, showing the routes of the Yellowstone Park Transportation Company, is supplied through the courtesy of the Northern Pacific Railway Company

What SUPERTWIST Adds to Goodyear Tires

You know what rugged strength and long life have always been built into Goodyear Pneumatic Bus Tires.

Now you may confidently expect even greater service from Goodyears in motorbus service, because Goodyear Pneumatic Bus Tires are now made with SUPERTWIST.

SUPERTWIST is the extra elastic, extra enduring new material specially developed by Goodyear for Goodyear balloon tires, motorbus and heavy duty cord tires.

It far outstretches ordinary cotton cord, and has a maximum flexing power that yields under impact, protecting the tire from rupture, stone bruise and other injuries. It thus insures virtually *double* the *carcass* life of the tire.

Other exclusive features of the Goodyear Pneumatic Tire construction for motorbus service are (1) the new Goodyear band-building method; (2) the new Goodyear breaker; (3) the new Goodyear bead—patent applied for, and (4) the famous All-Weather Tread.

These advantages you get only in Goodyear Pneumatic Bus Tires—the only motorbus tires made of SUPERTWIST.

They are real advantages, because they result in the utmost durability, tractive power, road safety, riding comfort and long, trouble-free mileage at low cost.

Goodyear Means Good Wear

GOODYEAR

Copyright 1926, by The Goodyear Tire & Rubber Co., Inc.

Nothing takes the place of Leather



In selling rides - - -

Nothing helps more than a comfy seat

Your customers are easily persuaded to wait for the car that has the most comfortable seats.

And your costs-per-mile maintenance are reduced when you use real leather, for it will stand up years longer than any other covering.

We are able to offer you complete hides or we will cut them to your pattern, if you submit paper templets.

This subject is one that demands your immediate attention. Send for samples for your examination.

Hyaline Grains
Hand Buffs
Machine Buffs
Special Machine Buffs

Cleveland
Denison Ave.
and Jennings Rd.

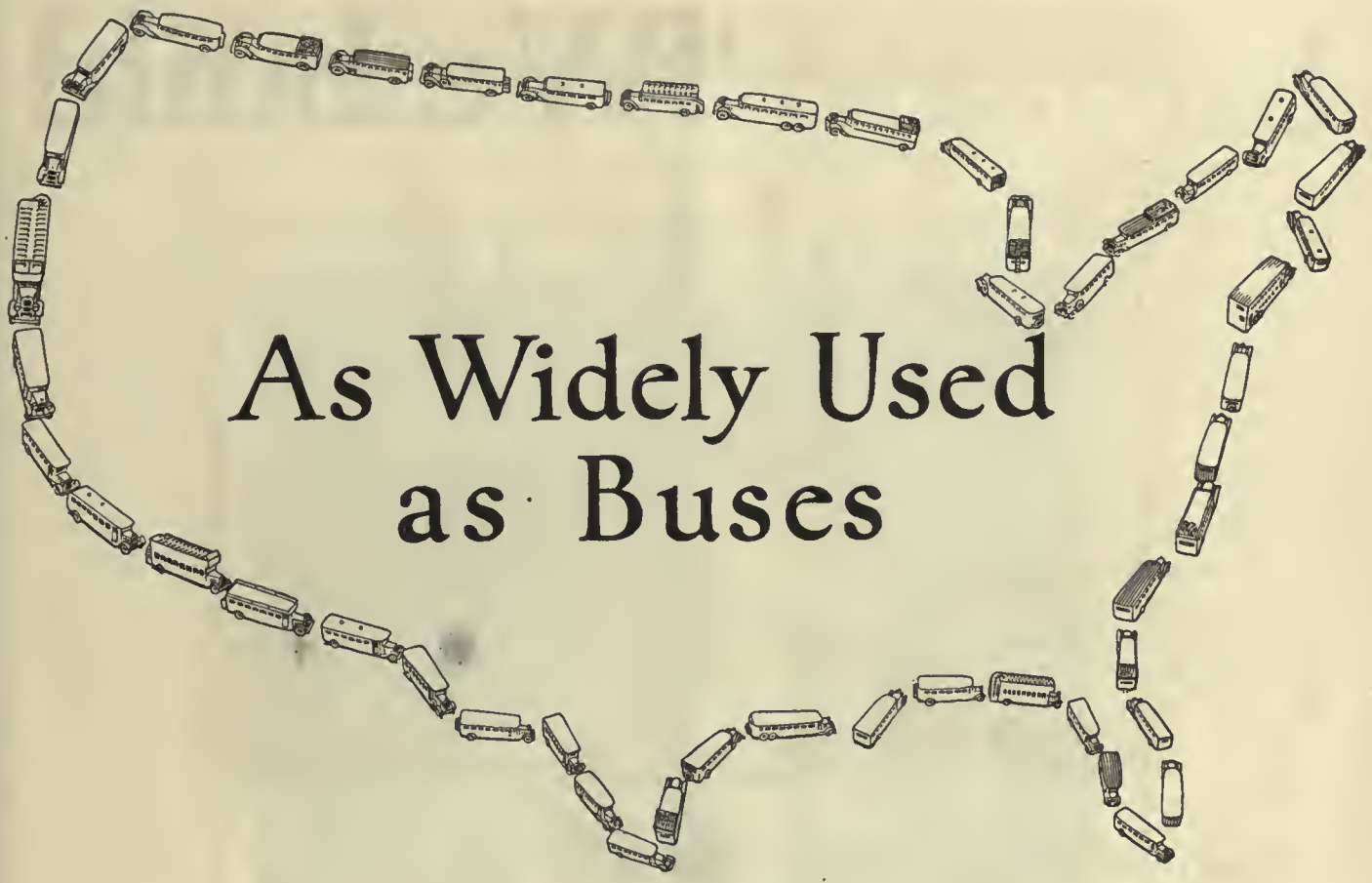
Western Representatives
Midgeley & Borrowdale
McCormick Bldg., Chicago

© Tanning Company
Cleveland, Ohio

Eastern Representatives
L. D. Rockwell Co.
Nat'l City Bldg., N. Y. C.

HYALINE

The Finest Coach Leather Obtainable



As Widely Used as Buses

THE giant growth of the bus industry has been almost entirely an increase in the number of Timken-equipped buses! For more than 95% of all makes of buses in America are engineered around Timken Tapered Roller Bearings. Never has the endorsement of a single automotive unit been more nearly unanimous. The most notable thing about it is that Timkens are so successfully serving the two masters of the modern bus—the Management with its constantly stricter cost standards—and the Public with its constantly higher service demands.

Maintenance departments know that Timkens hold shafts, gears and wheels in permanent fine alignment, with no attention but greasing or oiling, at comparatively rare intervals. The threat of bearing thrust, shock and speed is nullified by Timken tapered design, *POSITIVELY ALIGNED ROLLS* and Timken-made steel. Timkens are *more* than anti-friction bearings!

To bus passengers Timkens mean smoother, surer transportation, on schedule, at rates which are favorably affected by Timken economies.

Logically, in buses, as in trucks and rail cars, Timken Bearings are provided by an overwhelming majority of all makers.

THE TIMKEN ROLLER BEARING CO., CANTON, OHIO

TIMKEN *Tapered Roller* **BEARINGS**

"We build



John R. McKay, *Chief Engineer, Indiana Service Corporation, Fort Wayne. Mr. McKay is numbered among America's better known electric railway engineers. He is a member of the Standing Committee on Way and Structures of the A. E. R. E. A.*

for smoothness and easy riding"

"WE have taken special pains in our track construction work to build for smoothness and easy riding, both for our own cars and for automobile traffic." So says John R. McKay, Chief Engineer of the Indiana Service Corporation.

"Particular attention has been paid to arterial crossings, with the result that motorists can cross the tracks without feeling them at all.

"We have been greatly aided in our endeavor to get smoother, less noisy crossings, by the use of an asphaltic cushion next to the rails. This has the advantage of being easily applied, and in addition to deadening sound it gives us a tight construction that keeps out water."

To improve track construction in Fort Wayne, the Indiana Service Corporation has made extensive use of the Carey Elastite System of Track Insulation—and with highly successful results. Complete information on request.

The Philip Carey Company

Lockland, Cincinnati, Ohio

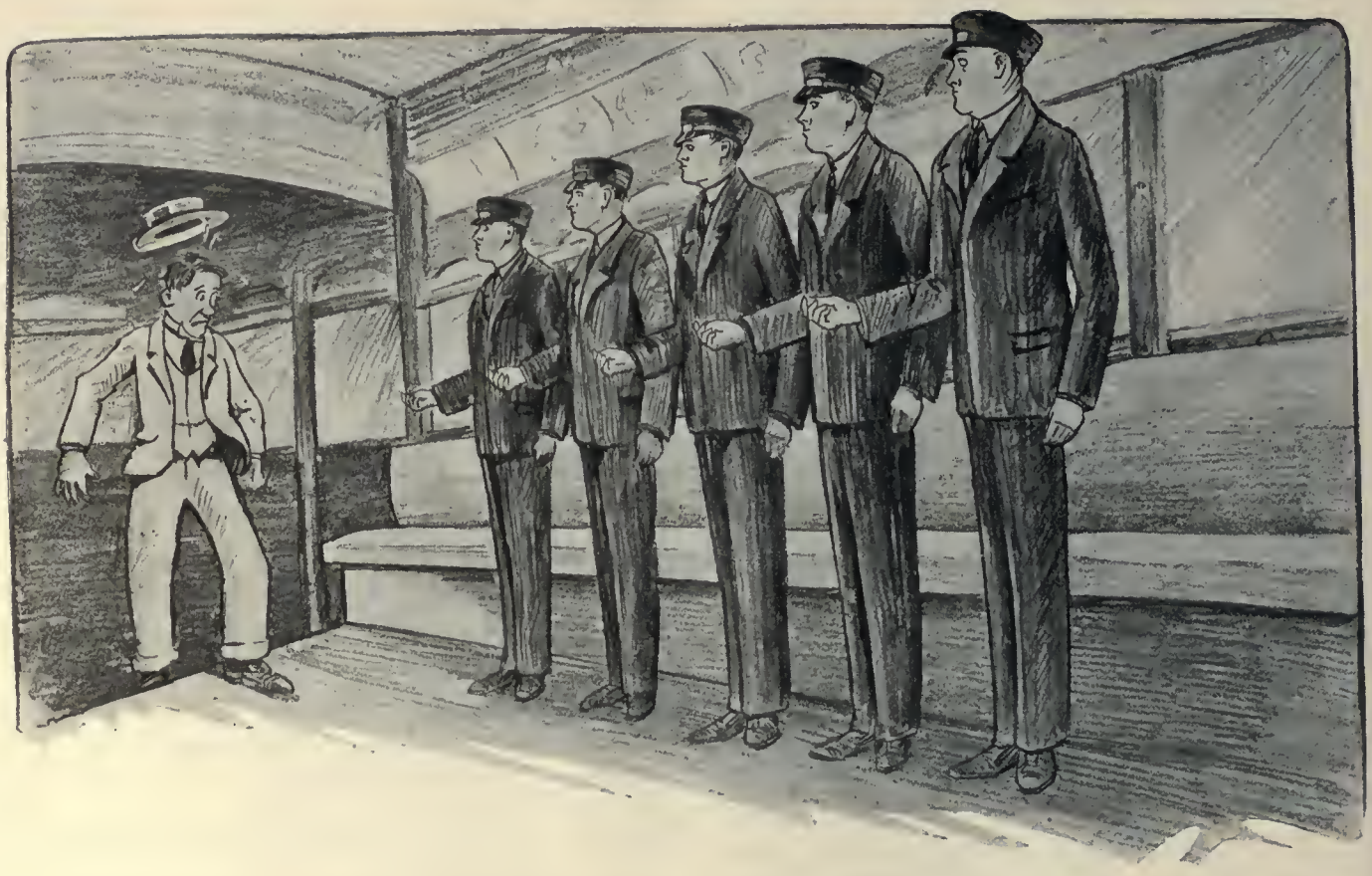


Fort Wayne electric railway tracks in process of construction—showing the slabs of Carey Elastite Rail Filler in place.

The Carey Elastite System of Track Insulation consists of precast slabs of a fibrous asphaltic compound, which form a resilient cushion betwaen rails and pavement. A biow with a sledge sets the alabs in place. Unaffacted by moisture or changes in temperature.

Carey Elastite

SYSTEM OF TRACK INSULATION



Five Conductors On One Car

Just suppose you boarded a street-car and were confronted by five conductors.

No. 1 says, "I want three cents for labor."
No. 2 " "I want one cent for interest on bonds."
No. 3 " "I want one cent for power."
No. 4 " "I want one cent for depreciation damages."
No. 5 " "Cough up a cent for profit, taxes, material, etc."

If you could talk at all, your remarks would be eloquent.

Yet, when you come to think of it, would that be any more ridiculous than for the street railway, the electric light company, the telephone company, and a couple of telegraph companies having and maintaining separate lines of poles on the same streets when one or two lines would look better and save a lot of money?

Elreco Steel Combination Railway and Lighting Poles are made for just such purpose. Wherever they are installed on this plan, the improved appearance of curb lines, the saving in cost for all concerned, and reduction of pole maintenance pleases everybody.

Moreover such installations are in line with the modernization of equipment which street railways all over the country are finding both desirable and profitable.

We have some interesting facts on how utilities in many cities have put over this money saving co-operation—write for them.



BEFORE

ELRECO
POLES

The Electric Railway Equipment Company

CINCINNATI, O.

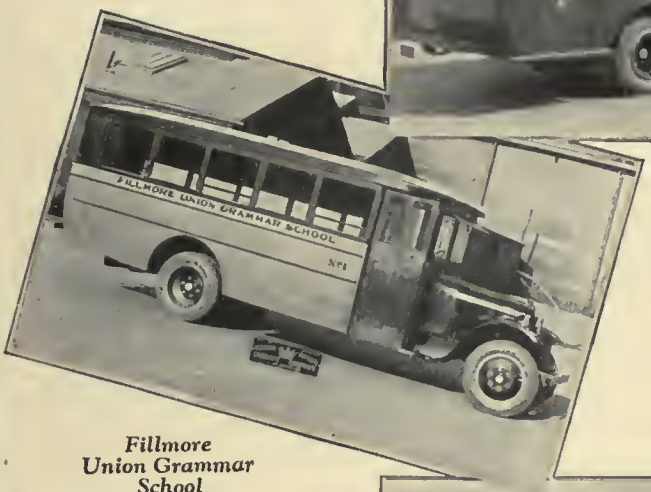
New York Office: 30 Church St.



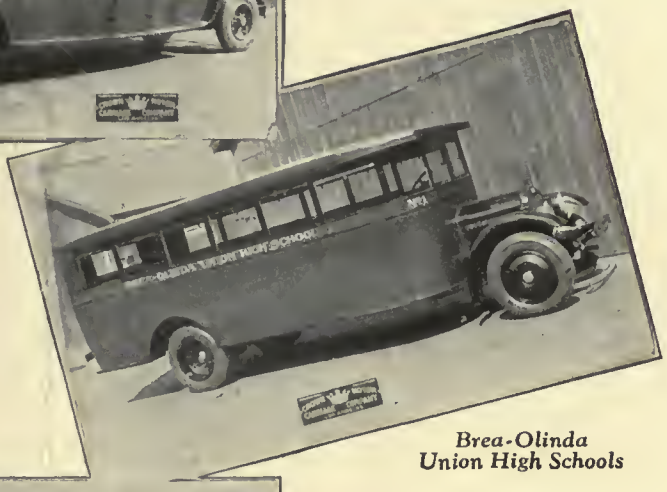
AFTER



Fullerton Union High School



Fillmore Union Grammar School



Brea-Olinda Union High Schools



Yuma Union High School

Western School Buses With PLYMETL Sides

THE experience gained in nearly a quarter century devoted to the development of the finest commercial and bus bodies has led the Crown Motor Carriage Company, Inc., Los Angeles, California, to standardize upon and recommend PLYMETL for school bus bodies. A few of the typical jobs turned out by this company are shown in the illustrations.

Such bodies have the big advantage of economy in operation on account of their light weight and are particularly valuable for school use on account of the high factor of safety provided in these strong, impact-resisting side panels.

Detailed descriptions and list of users will be sent to anyone interested.

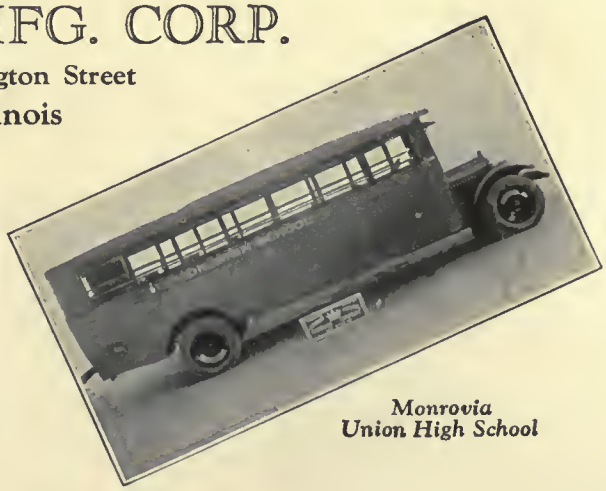
HASKELITE MFG. CORP.

133 West Washington Street

Chicago, Illinois



Arroyo Grande Union High School



Monrovia Union High School

Nation-Wide Triumph

Studebaker leadership established within a year—Studebaker Bus routes link the nation, covering the country from coast to coast and penetrating every state in the Union.



AS the map shows, Studebaker Busses are in operation in practically every section of the United States. Note the Studebaker routes outlined . . . connecting principal cities from coast to coast, from Canada to Gulf . . . serving hundreds of communities over all kinds of roads . . . across desert sand in New Mexico, over mountain grades in Montana, through clinging gumbo as well as over the splendid modern boulevard . . . everywhere providing comfortable, dependable transportation *at a higher profit to the operator.*

Increased profit through low first cost, low operating cost and low depreciation . . . this explains Studebaker leadership.

Low First Cost: Due to standardized design and large-scale production, the first cost of the medium-capacity Studebaker Bus, complete with body, is practically half the cost of the large-capacity bus. This effects a saving of from $2,000 to $4,000 per bus. It enables an operator to buy twice as many Studebaker busses for the same original outlay.

Low Operating Cost: Because the medium-size Studebaker Bus is 50% lower in weight than the average truck-type bus, its operating costs are much lower. Operators report an average operating cost of 7 to 9 cents per mile, against 16 to 17 cents per mile for the same items of operating expense on the average heavy truck-type bus.

Low Depreciation: As shown by the partial list at the right, there are scores of Studebaker Busses with records of over 100,000 miles . . . some 200,000 and even 300,000 miles. Thus, the low first cost of Studebaker equipment coupled with exceptionally long life cuts depreciation to a minimum.

Obviously, if you buy a bus of ample passenger capacity for half the price of the average bus . . . operate it at a lower cost per mile . . . and drive it over 100,000 miles, as records prove possible . . . you obtain a much higher profit per passenger mile. That is why the Studebaker Bus offers more for your money . . . yields a proved higher dollars-and-cents return on your investment.

These 100,000-Mile Studebak Busses give proof of long, dependable service

Operators listed below and at the right h one or more Studebaker Busses which h traveled over 100,000 miles. This is a par list, including only those Studebaker Bus which have been reported to the factory are still in active service. There are hundr more throughout the world, for the Stu baker Big Six passenger-car chassis—p to the introduction of the specially desig Studebaker Bus chassis—was even then choice of hundreds of bus operators.

	Mi Per
R. J. Todd, Spearfish, S. D.	200
R. J. Todd, Spearfish, S. D.	100
Danville Terre Haute Limited Bus Co., Danville, Ill	150
H. A. Lippitt, Hamilton, Ill.	200
H. A. Lippitt, Hamilton, Ill.	135
Loyal J. Boyd, Salina, Kans.	140
Eastern Carolina Coach Co., Inc., Charlotte, N. C.	150
Eastern Carolina Coach Co., Inc., Charlotte, N. C.	127
Bellaire-Neff Bus Co., Bellaire, Ohio	133
Bellaire-Neff Bus Co., Bellaire, Ohio	157
Craig A. Shields, Adena, Ohio	222
Ohio Transit Co., Lancaster, Ohio	250
Ohio Transit Co., Lancaster, Ohio	110
Ohio Transit Co., Lancaster, Ohio	108
Ohio Transit Co., Lancaster, Ohio	100
R. A. MacCartney, Joplin, Mo.	123
Diamond Bus Co., Patton, Pa.	120
Clyde O. Hammond, New Lexington, Ohio	150
Clyde O. Hammond, New Lexington, Ohio	170
Clyde O. Hammond, New Lexington, Ohio	142
Adrian-Ann Arbor Motor Coach Co., Adrian, Mich.	120
J. W. Bilyeu, Bedford, Ind.	110

STUDEBAKER BUS

for Studebaker Busse



The red lines show the principal routes of Studebaker Bus operators. It is now possible to travel in Studebaker Busses from New York to Los Angeles, except for two gaps, aggregating approximately 200 miles. Studebaker Busses are being operated in every state in the Union.

	Miles Per Unit
yal Blue Transportation Co.,	
reensboro, N. C.	150,000
yal Blue Transportation Co.,	
reensboro, N. C.	125,000
yal Blue Transportation Co.,	
reensboro, N. C.	100,000
ag Bros. Transit Co., Marion, Ohio	225,000
ag Bros. Transit Co., Marion, Ohio	165,000
ag Bros. Transit Co., Marion, Ohio	165,000
ag Bros. Transit Co., Marion, Ohio	100,000
ag Bros. Transit Co., Marion, Ohio	125,000
Hanenkratt, Glendale, Ariz.	150,000
. King, Helena, Mont.	168,000
F. King, Helena, Mont.	175,340
& Eddie Coleman, Springfield, Ohio	350,000
d Davis, Columbus, Ohio	250,000
non Ball Trans. Co., Portsmouth, Ohio	150,000
th & Boatshick, Columbus, Ohio	150,000
J. West, Dayton, Ohio	250,000
land Trail Transit Co., Charleston, W. Va.	150,000
eeling-Cambridge, Cambridge, Ohio	200,000
l Star Trans Co., Cambridge, Ohio	150,000
J. Daniels & Son, Parkersburg, W. Va.	125,000
G. Webb, Lexington, Ky.	300,000
cinnati-Hamilton Line, Cincinnati, Ohio	150,000
cinnati-Louisville Line, Cincinnati, Ohio	150,000
er & Watson, Zanesville, Ohio	150,000
l Fent, Xenia, Ohio	100,000
ag Bros., Marion, Ohio	150,000
l Star Trans. Co., Springfield, Ohio	125,000
g Bros., Dayton, Ohio	150,000
ahontas Trans. Co., Bluefield, W. Va.	150,000
on Transfer Co., Murfreesboro, Tenn.	100,000
on Transfer Co., Murfreesboro, Tenn.	100,000

	Miles Per Unit
W. C. Hadley, Joelton, Tenn.	100,000
H. H. Motor Line, Las Cruces, N. Mex.	147,563
H. H. Motor Line, Las Cruces, N. Mex.	128,472
Green Star Bus Line, Smithfield, Ohio	350,000
Green Star Bus Line, Smithfield, Ohio	400,000
Green Star Bus Line, Smithfield, Ohio	200,000
Green Star Bus Line, Smithfield, Ohio	150,000
Robert Mason, Utica, Ohio	110,000
The Wheeling, St. Clairsville & Cambridge Transportation Co., St. Clairsville, Ohio	200,000
The Wheeling, St. Clairsville & Cambridge Transportation Co., St. Clairsville, Ohio	125,000
The Wheeling, St. Clairsville & Cambridge Transportation Co., St. Clairsville, Ohio	100,000
The Wheeling, St. Clairsville & Cambridge Transportation Co., St. Clairsville, Ohio	150,000
Cambridge-Marietta Bus Line, Cambridge, O.	175,000
Cambridge-Marietta Bus Line, Cambridge, O.	175,000
Cambridge-Marietta Bus Line, Cambridge, O.	153,000
Cambridge-Marietta Bus Line, Marietta, O.	153,000
Cambridge-Marietta Bus Line, Marietta, O.	133,000
Cambridge-Marietta Bus Line, Marietta, O.	133,000
Cambridge-Marietta Bus Line, Marietta, O.	185,000
Cambridge-Marietta Bus Line, Marietta, O.	117,000
G. W. Angel, Franklin, N. C.	128,000
J. M. Tolbert, Newberry, S. C.	150,000
Larry Miller, Bemidji, Minn.	104,000
Lee Price, Columbia City, Ind.	150,000
W. F. Reynolds Bus Lines, Lexington, Ohio	160,000
Brown & Son, The Dalles, Ore.	190,000
Brown & Son, The Dalles, Ore.	175,000
Brown & Son, The Dalles, Ore.	155,000
Brown & Son, The Dalles, Ore.	150,000
Brown & Son, The Dalles, Ore.	125,000

	Miles Per Unit
Parrish Stage Line, Deming, N. Mex.	150,000
Parrish Stage Line, Deming, N. Mex.	115,000
Denver Steamboat Stage Co., Denver, Colo.	160,000
Denver Steamboat Stage Co., Denver, Colo.	125,000
Ed Blankenburg, Glendive, Mont.	125,000
Blue Bird Transit Co., Glendive, Mont.	150,000
Jud S. Skowten, Cheboygan, Mich.	174,000
Cannon Ball Transp. Co., Portsmouth, Ohio	193,000
Cannon Ball Transp. Co., Portsmouth, Ohio	193,000
Cannon Ball Transp. Co., Portsmouth, Ohio	193,000
Cannon Ball Tranap. Co., Portsmouth, Ohio	155,000
Cannon Ball Transp. Co., Portsmouth, Ohio	165,000
Cannon Ball Transp. Co., Portsmouth, Ohio	165,000
Cannon Ball Tranap. Co., Portsmouth, Ohio	120,000
Cannon Ball, S. V. Div., Portsmouth, Ohio	145,000
Cannon Ball, S. V. Div., Portsmouth, Ohio	145,000
Cannon Ball, S. V. Div., Portsmouth, Ohio	145,000
Cannon Ball, S. V. Div., Portsmouth, Ohio	115,000
Cannon Ball, S. V. Div., Portsmouth, Ohio	115,000

CHASSIS

Mail the Coupon for Free Book, "Profitable Bus Operation"

The Studebaker Corporation of Ame
Dept. B South Bend, Ind.

Send me free "Profitable Bus Operation" out obligation.

Name.....

Address.....

City..... State.....

We have.....busses at present.

Check below the Studebaker Bus about which y sire information.

Type: Sedan.....Parlor Car.....Street-Car Ty

Capacity:.....Passengers.

PROFIT-SEEKING DEALERS WILL READ

THESE 7 IMPORTANT STATEMENTS

ABOUT THE LEADING
HEAVY DUTY TIRE
ON THE MARKET



THE CENTURY BUS SPECIAL

(1) A brand new principle in the construction of a heavy duty bus tire.

(2) Tire retains same shape when inflated and giving service as before mounting on rim.

(3) Special material used in construction.

(4) Because of and we guarantee greater mileage than any other bus tire now on the market.

(5) This improved heavy duty tire will greatly reduce mileage cost.

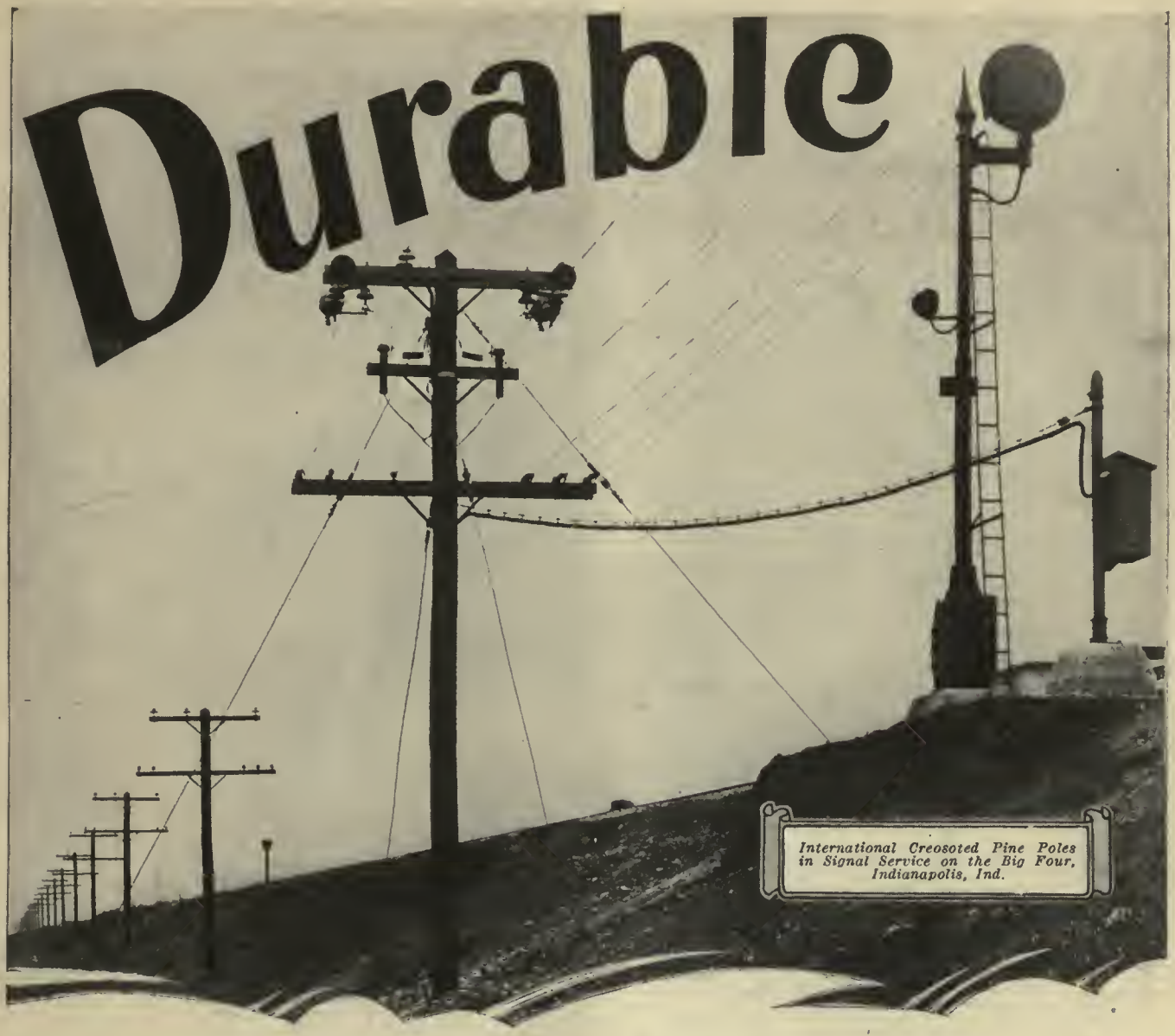
(6) Make us prove the truth of the above statements.

(7) Write today for complete information.

CENTURY RUBBER WORKS

54TH AVENUE AND WEST 18TH STREET, CHICAGO, ILLINOIS

Durable



International Creosoted Pine Poles in Signal Service on the Big Four, Indianapolis, Ind.

INTERNATIONAL Creosoted Pine Poles like those illustrated, have been in service 25 years and their condition indicates they are good for many more years.

Leading public utility organizations, as the result of long experience with poles, attribute a life of more than 25 years to creosoted pine, and know that the service the year round is dependable.

It is sound economy to buy ***International*** Creosoted Pine Poles — their remarkable durability insures long life, lower maintenance, minimum replacements and added years of reliable service.

International Creosoting & Construction Co.
General Office—Galveston, Texas

International
CREOSOTED YELLOW PINE POLES

All Over The

Dayton Ties Are Cutting Track And



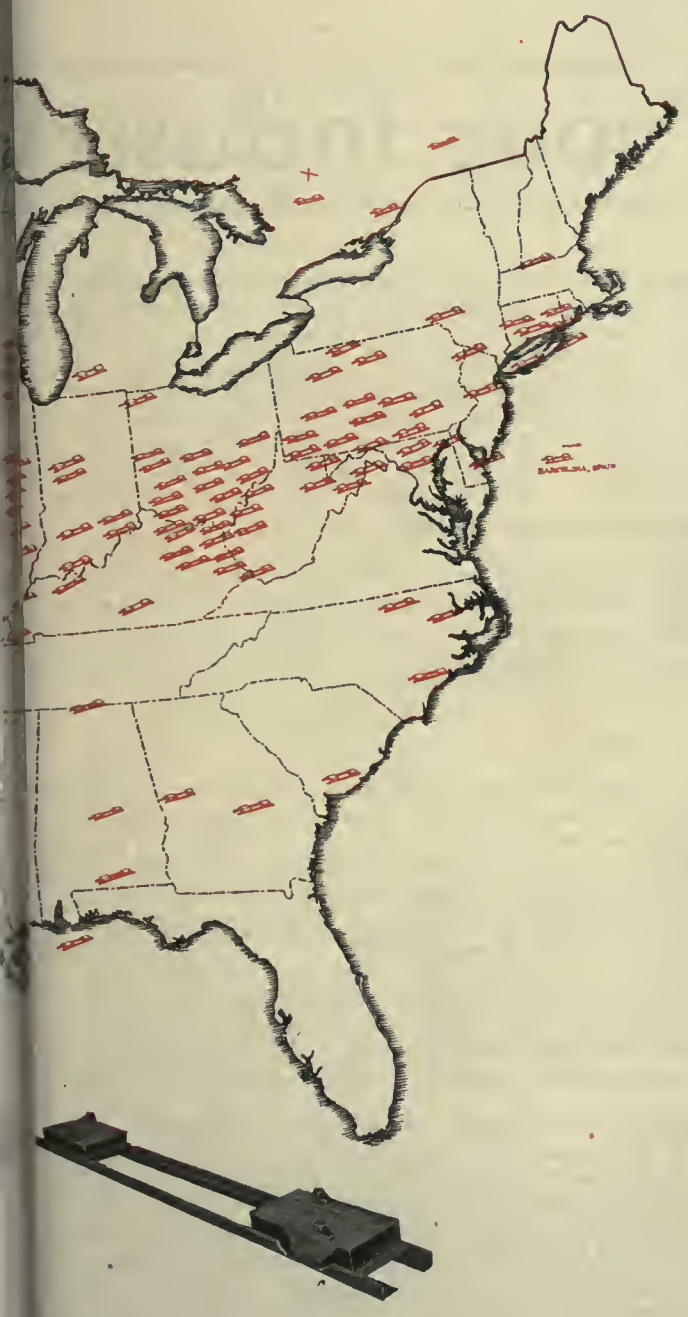
Every Red Tie
Is a Dayton Installation

The Dayton

Dayton

Nation

olling Stock Maintenance Costs



Each little red tie on this map indicates a street railway that uses Dayton Mechanical Ties.

All over the nation, Dayton Ties through inbuilt resilience and durability are reducing maintenance by one half, practically wiping out track repairs, allowing bigger earnings, and bettering public relations.

When track is laid on them, 10 years' severe service leaves it smooth—almost as good as new—ready for another 10.

Small wonder, then, that as users expand their lines, they order and re-order more and more Daytons.

Investigate Dayton Ties—they give you permanently smoother street railway track. First cost is less than for wood tie construction. *Send for complete information.*

The Dayton Mechanical Tie Co.

Dayton, Ohio

Why Dayton Ties Are Better

It is a peculiarity of concrete that it will stand enormous pressure loads, but breaks up at once under pounding.

Dayton Mechanical Ties provide a cushioning resilience which absorbs the pounding shock of wheels, so that pressure only, is transmitted to the concrete.

Thus, the concrete lasts indefinitely, and as constant shocks also wear out rolling stock, Dayton Ties will decrease such repairs by one half.

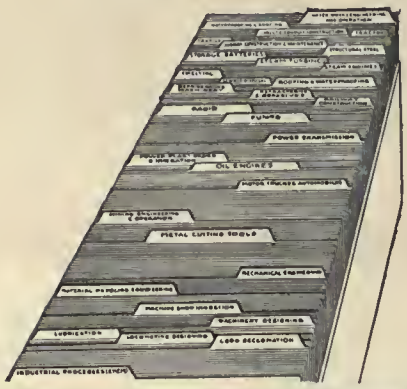
A Dayton Tie consists of two steel pans, or boxes, separated by angle irons. The angle irons preserve the gauge, and re-enforce the concrete ballast.

In the bottom of each pan is a layer of highest grade of asphalt. A selected, thoroughly seasoned white oak block rests on the asphalt, confining it to the pan.

It is this combination of oak and confined asphalt which gives the correct degree of resilience.

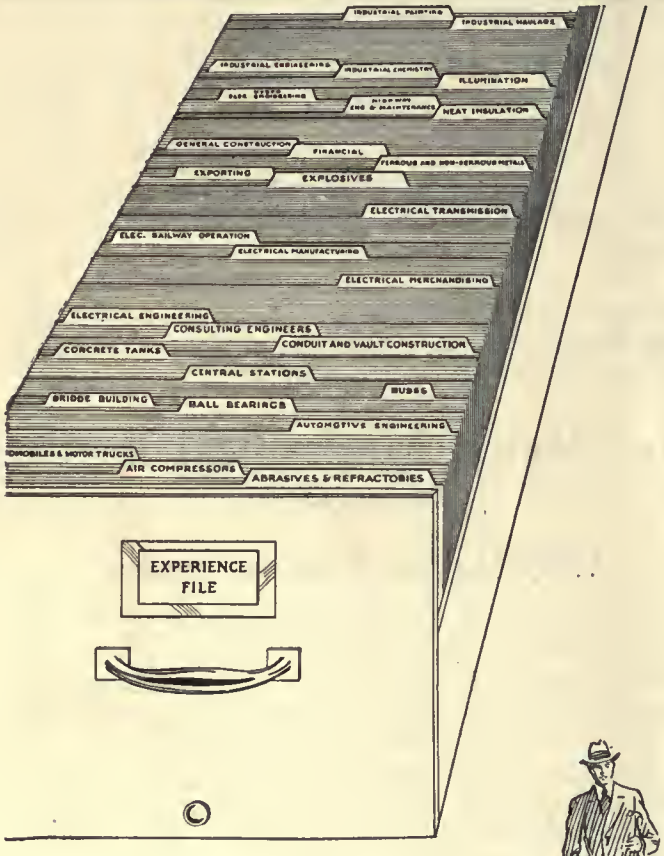
Mechanical Tie Co.,

Ohio





Knowledge of your industry





A Few Facts From The Experience Index

Going through the McGraw-Hill experience file at random you will find such facts as these:

5 McGraw-Hill men formerly in automotive engineering.

8 McGraw-Hill men formerly in material-handling engineering.

2 McGraw-Hill men formerly in subway construction.

12 McGraw-Hill men formerly with process (chemical) industries.

9 McGraw-Hill men formerly in electrical merchandising.

4 McGraw-Hill men formerly consulting engineers.

16 McGraw-Hill men formerly with central stations.

9 McGraw-Hill men formerly with electric railways.

6 McGraw-Hill men formerly machinery designers.

And so on.

From shop and mine, from factory and generating station, from chemical laboratory and construction job, from jobber and dealer, have come the men who make the McGraw-Hill organization. Production men, operating experts, specialists in selling from many industries have come to develop the McGraw-Hill Publications as authorities in industry..... authorities, first, to their subscribers, the creators and builders of industry.....authorities, next, to the men who are selling to industry.

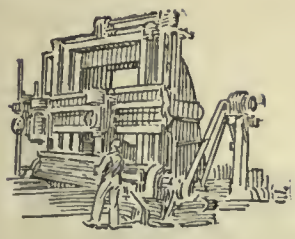
As editors, department heads, service men, marketing counselors and field representatives, these men have become essential units in the McGraw-Hill organization, absorbing its purpose and spirit and devoting their fine attainments to carrying forward its tradition of over a half-century's service to industry.

The experience of these men has been cataloged, classified and filed for instant reference. That file is the nerve center of the organization. Thumb over the index tabs and it will be strange if you do not find a man, or twenty men, who have a working knowledge of the industry to which you sell, or the equipment which you make.

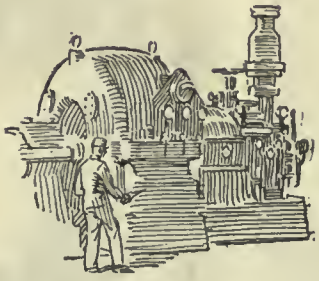
For more than fifty years the McGraw-Hill Company has known industrial America. Its contacts have been inside contacts; its fund of experience is the composite gained in shop, factory and field.

Through this intimate knowledge and constant contact, McGraw-Hill seven years ago sensed the step that industry is now taking in applying to its selling the same science and caution that have advanced industrial production and reduced costs. The service of McGraw-Hill Publications was extended to embrace not only the publishing of technical information on production and engineering but counsel on scientific, waste-free selling. This counsel is epitomized in the following McGraw-Hill Four Principles of Industrial Marketing which today are bringing country-wide endorsement from industry, bank, advertising agency and university.

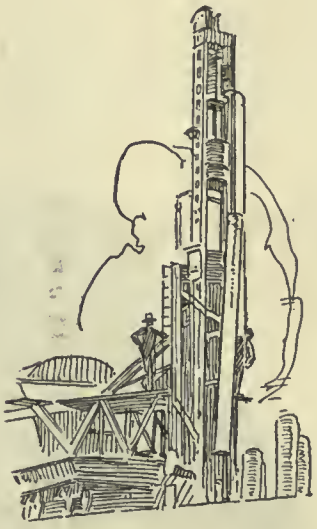
MARKET DETERMINATION—An analysis of markets or related buying groups to determine the







is here!



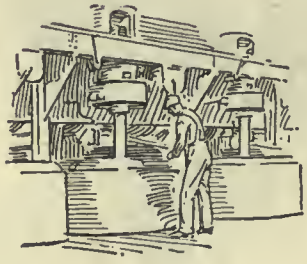
potential of each. With a dependable appraisal of each market, selling effort can be directed according to each market's importance.

BUYING HABITS—A study of the selected market groups to determine which men in each industry are the controlling buying factors and what policies regulate their buying. Definite knowledge eliminates costly waste in sales effort.

CHANNELS OF APPROACH—The authoritative publications through which industries keep in touch with developments are the logical channels through which to approach the buyer. In a balanced program of sales promotion these publications should be used effectively and their use supplemented by a manufacturer's own literature and exhibits.

APPEALS THAT INFLUENCE—Determining the appeals that will present the product to the prospective buyer in terms of his own self-interest or needs.

These Four Principles are more than a formula. They are a method, repeatedly tested by practical application, backed by a half-century of intimate acquaintance with industry. Any manufacturer selling to industry can apply them to advantage in his own marketing program. Our Marketing Counselors will be glad to lay the details before you or your advertising agent. A conference can be arranged by communicating with our nearest office.





McGRAW-HILL PUBLISHING COMPANY, INC., NEW YORK, CHICAGO, PHILADELPHIA, CLEVELAND, ST. LOUIS, SAN FRANCISCO, LONDON

McGRAW-HILL PUBLICATIONS

45,000 Advertising Pages used Annually by 3,000 manufacturers to help Industry buy more effectively.

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ENGINEERING NEWS-RECORD
SUCCESSFUL METHODS

ELECTRICAL
ELECTRICAL WORLD JOURNAL OF ELECTRICITY
ELECTRICAL MERCHANDISING

INDUSTRIAL
AMERICAN MACHINIST INDUSTRIAL ENGINEER
CHEMICAL & METALLURGICAL ENGINEERING
POWER

MINING
ENGINEERING & MINING JOURNAL
COAL AGE

TRANSPORTATION
ELECTRIC RAILWAY JOURNAL
BUS TRANSPORTATION

OVERSEAS
INGENIERIA INTERNACIONAL
AMERICAN MACHINIST
(EUROPEAN EDITION)

RADIO
RADIO RETAILING

CATALOGS & DIRECTORIES
ELECTRICAL TRADE CATALOG
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KEYSTONE CATALOG (COAL EDITION) KEYSTONE CATALOG (METAL-QUARRY EDITION)
COAL CATALOG CENTRAL STATION DIRECTORY
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ANALYSIS OF METALLIC AND NON-METALLIC MINING, QUARRYING AND CEMENT INDUSTRIES

Right on your desk
—*just the data you want*

Electric railway executives, engineers and operating men have long respected Richey's ELECTRIC RAILWAY HANDBOOK as the one great pocketbook of practice data, formulas and tables in the electric railway field.

The second edition of Richey covers the latest developments—describes new methods—records changes in theory and practice. It covers every phase of electric railway work from Roadbed and Track to Signals and Communication.

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This widely-known handbook is virtually an encyclopedia on modern electric railway organization, administration and operation.

It presents

(1) Data on subjects which come up in everyday electric railway practice for constant use by the operating, constructing and designing engineer.
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Information every electric railway man needs—the latest and best methods—changes in practice and theory—that's the New Richey.

See your copy FREE
Mail just this coupon

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FREE EXAMINATION COUPON

McGraw-Hill Book Co., Inc., 370 Seventh Ave., New York, N. Y.

You may send me on 10 days' approval Richey's Electric Railway Handbook, $4.00 net. I agree to pay for the book or return it postpaid within 10 days of receipt.

Signed .....

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Official Position .....

Name of Company .....

(Books sent on approval to retail purchasers in the U. S. and Canada only.) E 6-26-26

Nuttall



The new

Nuttall Form US 20A
Timken Roller Bearing Trolley Base

A really *new* trolley base, simplified and engineered to the same high standards of efficiency and low maintenance as the modern car motor. Incorporates the famous Timken Roller Bearing — a tapered double-race roller bearing designed by this manufacturer especially for trolley base service.

Profitably interesting features include extreme sensitiveness, with swiveling strains evenly distributed on bearings; oil and grease reservoirs for lubrication of bearings and pole socket axle pin respectively; quick, easy lubrication only once in six months.

Full specifications on request.

MEMBER AERA 1926

R.D. NUTTALL COMPANY
PITTSBURGH PENNSYLVANIA

All Westinghouse Electric & Mfg. Co. District Offices are Sales Representatives in the United States for the Nuttall Electric Railway and Mine Haulage Products. In Canada: Lyman Tube & Supply Co., Ltd., Montreal and Toronto.



When you modernize be sure to Miller-ize

To consider these five points of superiority is to realize how well Miller Trolley Shoes fit into the industry's modernization movement.

1. Less wire wear. Full 3-inch sliding contact surface "hugs" the wire closer than any wheel—so that less trolley tension is required for absolutely safe operation.

2. Less shoe wear. Sliding contact of shoe lasts longer than wheel because there are no bearings to wear out and only a few moving parts.

3. No lubrication. The absence of rotating parts eliminates the time and labor required to oil the bearing of the trolley wheel.

4. No arcing. Constant contact prevents the pits and burns that are found in the ordinary trolley and contact device.

5. Ample current capacity. Sliding contact handles heavier current drafts than trolley wheels—and always insures steady power for motors and lights.

To provide you with further proof of Miller Trolley Shoe ability, we will gladly co-operate for a trial under your own conditions.

Miller Trolley Shoe Company

295 Columbia Road, Boston 21, Mass.

MILLER TROLLEY SHOES

You're having brush trouble

CORRECT IT

USE LE CARBONE CARBON BRUSHES

They talk for themselves

COST MORE PER BRUSH
COST LESS PER CAR MILE

W. J. Jeandron
Hoboken Factory Terminal,
Building F, Fifteenth Street, Hoboken, N. J.
Pittsburgh Office: 634 Wabash Bldg.
Chicago Office: 1657 Monadnock Block
San Francisco Office: 525 Market Street
Canadian Distributors: Lyman Tube & Supply Co., Ltd., Montreal and Toronto

B. A. HEGEMAN, Jr., President H. A. HEGEMAN, First Vice-Pres. and Treas.
F. T. SARGENT, Secretary W. C. PETERS, Vice-Pres. Sales and Engineering

National Railway Appliance Co.
Grand Central Terminal, 452 Lexington Ave., Cor. 45th St., New York

BRANCH OFFICES
Munsey Bldg., Washington, D. C. 100 Boylston St., Boston, Mass.
Hegeman-Castle Corporation, Railway Exchange Building, Chicago, Ill.

RAILWAY SUPPLIES

Tool Steel Gears and Pinions
Anglo-American Varnish Co., Varnishes, Enamels, etc.
National Hand Holds
Genesco Paint Oils
Dunham Hopper Door Device
Garland Ventilators
Walter Tractor Snow Plows
Ft. Pitt Spring & Mfg. Co., Springs
Flaxlinum Insulation
Anderson Slack Adjusters
Economy Electric Devices Co., Power Saving and Inspection Meters
Yellow Coach Mfg. Company—Single and Double-deck Buses

***The* DIFFERENTIAL CAR**



Standard on 60 Railways for

Track Maintenance
Track Construction
Ash Disposal
Coal Hauling
Concrete Materials
Waste Handling
Excevated Materials
Hauling Cross Ties
Snow Disposal

Use These Labor Savers

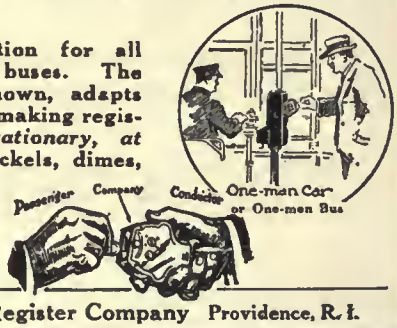
Differential Crane Car
Clark Concrete Breaker
Differential Bottom Dump Ballast Car
Differential Car Wheel Truck and Tractor

THE DIFFERENTIAL STEEL CAR CO., Findlay, O.

Instantaneous Registration by the Passenger

ROOKE SYSTEM of fare collection—

Meets every condition for all types of cars and buses. The stand device, as shown, adapts it to one-man uses—making register *portable* or *stationary, at* option. Handles nickels, dimes, quarters, or metal tickets, in *any combination,* FLEXIBILITY with CERTAINTY.



Rooke Automatic Register Company Providence, R. I.

Kalamazoo Trolley Wheels

The value of Kalamazoo Trolley Wheels and Harps has been demonstrated by large and small electric railway systems for a period of thirty years. Being exclusive manufacturers, with no other lines to maintain, it is through the high quality of our product that we merit the large patronage we now enjoy. With the assurance that you pay no premium for quality we will appreciate your inquiries.



THE STAR BRASS WORKS
KALAMAZOO, MICH., U. S. A.

TULC
A LUBRICANT

We make a specialty of
ELECTRIC RAILWAY LUBRICATION
We solicit a test of TULC on your equipment
The Universal Lubricating Co.
Cleveland, Ohio
Chicago Representatives: Jamieson-Ross Company, Straus Bldg.



Type R-11
Double Register

International Registers

Made in single and double types to meet requirements of service. For hand or foot, mechanical or electric operation. Counters, car fittings, conductors' punches.

The International Register Co.
15 South Throop Street, Chicago, Illinois

On the



CHICAGO, NORTH SHORE & MILWAUKEE R.R.



Phoenix Transportation Refrigerating Unit.

THESE five Phoenix Electric Refrigerator Cars, built by The Cincinnati Car Co., were put into service this past Spring.

The Chicago, North Shore & Milwaukee R.R. had realized for some time the possibilities for service and profit in refrigerator cars. Ice refrigerator cars could not be used because the drippings from melting ice would not be tolerated on the elevated tracks in Chicago.

The Company consulted as a matter of course The Phoenix Ice Machine Co., the only builders who have successfully adapted mechanical refrigeration for electric railway use.

The initial cost of a Phoenix Electric Refrigerator Car is slightly higher than that of an ice refrigerator car, but its productivity is several times as much, so that a Phoenix Electric is by far the cheapest refrigerator car made.

Standard freight and express cars can be readily converted into highly efficient Phoenix Electric Refrigerator Cars.

Write for descriptive literature.

The Phoenix Ice Machine Co.
Cleveland, Ohio

PHOENIX ICE MACHINE

88% use "Tool Steel" gears

Questionnaire Replies

THE 1925 A. E. R. A. Equipment Committee sent out a questionnaire on spur and helical gearing. To this questionnaire there were 18 companies replied who controlled a total of 14,910 cars. The lineup of these companies on "Tool Steel" is as follows:

Exclusive Users—9 companies controlling 7943 cars.....53%	88%
Part Users—6 companies controlling 5138 cars.....35%	
Non-Users—3 companies controlling 1829 cars.....12%	

As you analyze the 1925 Equipment Committee report on the gear subject bear in mind that the basis information was obtained from companies where 88% of the cars were controlled by those who used "Tool Steel" gears and pinions, either exclusively or regularly.

The Tool Steel Gear & Pinion Co.,
Cincinnati, Ohio



TOOL-STEEL QUALITY GEARS AND PINIONS
The Standard of Quality

PANTASOTE

Trade Mark

Seat and Curtain Materials

There is no substitute for Pantasote

AGASOTE

Trade Mark

Roofing—Headlining—Wainscoting

The only homogeneous panel board

standard for electric railway cars and motor buses

The PANTASOTE COMPANY Inc.
At 46th St. 250 Park Avenue
NEW YORK



AMERICAN BRIDGE COMPANY

EMPIRE BUILDING—71 BROADWAY · NEW YORK, N. Y.

Manufacturers of Steel Structures of all classes particularly BRIDGES AND BUILDINGS

ALSO STEEL BARGES FOR HARBORS AND RIVERS, STEEL TOWERS FOR ELECTRIC TRANSMISSION, HEROULT ELECTRIC FURNACES, ETC.

SALES OFFICES:

NEW YORK, N.Y. — Philadelphia, Pa. · Boston, Mass. · Baltimore, Md.

PITTSBURGH, PA. — Cincinnati, Ohio · Cleveland, Ohio · Detroit, Mich.

CHICAGO, ILL. — St. Louis, Mo. · Denver, Colo. · Salt Lake City, Utah · Duluth, Minn. · Minneapolis, Minn.

Pacific Coast Representative: U. S. Steel Products Co., Pacific Coast Dept. — San Francisco, Cal. · Los Angeles, Cal. · Portland, Ore. · Seattle, Wash.

Export Representative: United States Steel Products Co., 30 Church Street, New York.

Bethlehem Products for Electric Railways

Tee and Girder Rails; Machine Fitted Joints; Splice Bars; Hard Center Frogs; Hard Center Mates; Rolled Alloy Steel Crossings; Abbott and Center Rib Base Plates; Rolled Steel Wheels and Forged Axles; Tie Rods; Bolts; Tie Plates and Pole Line Material.

Catalog Sent on Request

BETHLEHEM STEEL COMPANY, Bethlehem, Pa.

BETHLEHEM

Wharton Special Trackwork

Trackwork of superior quality, incorporating the famous Tisco Manganese Steel.

WM. WHARTON JR. & CO., Inc.
EASTON, PA.

OFFICES:

Boston · Philadelphia · Chicago · Pittsburgh · El Paso · San Francisco · Montreal · New York · Scranton

Arc Weld Rail Bonds

AND ALL OTHER TYPES

Descriptive Catalogue Furnished

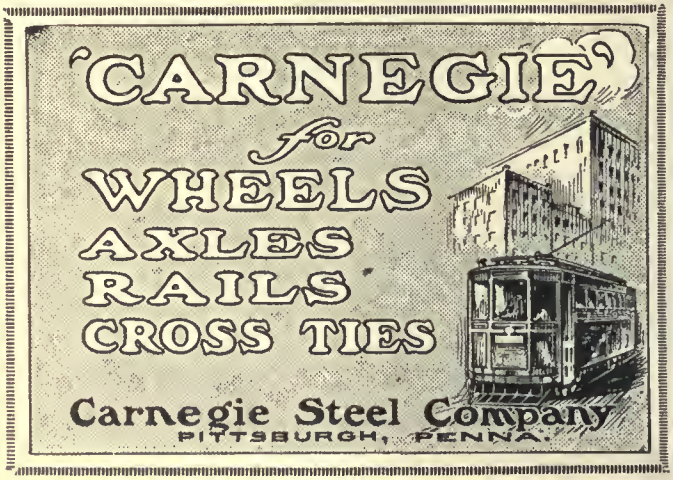
American Steel & Wire Company

Chicago · New York · Boston · Cleveland · Pittsburgh · Denver

U. S. Steel Products Co.

San Francisco · Los Angeles · Portland · Seattle





Lorain Special Trackwork Girder Rails

Electrically Welded Joints

THE LORAIN STEEL COMPANY
Johnstown, Pa.

Sales Offices:

Atlanta · Chicago · Cleveland · New York · Philadelphia · Pittsburgh · Dallas

Pacific Coast Representative:
United States Steel Products Company
Los Angeles · Portland · San Francisco · Seattle

Export Representative:
United States Steel Products Company, New York, N. Y.

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USED EQUIPMENT & NEW—BUSINESS OPPORTUNITIES

UNDISPLAYED—RATE PER WORD:

Positions Wanted, 4 cents a word, minimum 75 cents an insertion, payable in advance.

Positions Vacant and all other classifications, 8 cents a word, minimum charge $2.00.

Proposals, 40 cents a line an insertion.

INFORMATION:

Box Numbers in care of any of our offices count 10 words additional in undisplayed ads.

Discount of 10% if one payment is made in advance for four consecutive insertions of undisplayed ads (not including proposals).

DISPLAYED—RATE PER INCH:

1 to 3 inches.....$4.50 an inch
4 to 7 inches..... 4.30 an inch
8 to 14 inches..... 4.10 an inch

Rates for larger spaces, or yearly rates, on request.

An *advertising inch* is measured vertically on one column, 3 columns—30 inches—to a page.

ERJ

"SEARCHLIGHT" IS Opportunity Advertising

—to help you get what you want.

—to help you sell what you no longer need.

Take Advantage Of It

For Every Business Want

"Think SEARCHLIGHT First"

6167

POSITIONS WANTED

EXPERIENCED operator of electric railways and bus lines, co-ordinated and separate, immediately available to serve as manager, superintendent, publicity, public relations manager or in any official position pertaining to railway or bus operation. At present manager of large railway properties. PW-916, Electric Railway Journal, Tenth Ave. at 36th St., New York.

POSITION wanted as inspection or shop foreman, 10 years as armature winder, motor repairman, and acting inspection foreman, will guarantee good results. PW-914, Electric Railway Journal, 1600 Arch St., Phila., Pa.

SUPERINTENDENT transportation. With a wide experience and successful record on city and interurban properties also co-ordination of rail and bus service, successful in handling labor, public relations, etc. Recognized as a transportation official of exceptional ability fully capable of getting results on any property. At present engaged. Personal reasons for desiring change. Best of references. Correspondence invited. Address PW-915, Electric Railway Journal, Guardian Building, Cleveland, Ohio.

Rotary Converters

1—500 kw., 600-v., 833 amp., 900 r.p.m., 6-ph., compound wound Westinghouse Rotary Converter, with 3—165 kva., 60-cy., single ph., 13200 v. primary transformers with A.C. and D.C. panels.

1—300 kw., 600-v., 500 amp., 1200 r.p.m., 6-ph., compound wound interpole Westinghouse Rotary Converter, with 3—110 kva., 60-cy., single ph., 13200-v. primary transformers with A.C. and D.C. panels.

GEO. SACHSENMAIER CO.

926 N. Third St., Philadelphia, Pa.

FOR SALE

30 Birney Safety Cars

Brill Built

West. 508 or G. E. 264 Motors. Cars Complete—Low Price—Fine Condition.

ELECTRIC EQUIPMENT CO.
Commonwealth Bldg., Philadelphia, Pa.

If there is anything you want—

or something you don't want that *other* readers of this paper can supply—or use—advertise in the

SEARCHLIGHT SECTION

Somebody is always looking for something to meet certain business needs. Some men in charge of plant operations may be in the market for good used equipment—others may have just what they want, to sell. Some may require a man of unusual qualifications for a particular position—that man may be another reader of this paper!

Put the Searchlight Section to work for you under any of the following classifications—to fill your business needs.

Agencies Wanted
Agents Wanted
Auction Notices
Buildings For Sale
Business Opportunities
Civil Service Opportunities
Contracts To Be Let
Contracts Wanted
Educational Courses
Employment Agencies
Exchanges
For Rent Items
Franchises
Industrial Sites
Miscellaneous Wants
New Industries Wanted
Partners Wanted
Patents For Sale
Patent Attorneys
Plants For Sale
Positions Vacant
Positions Wanted
Property For Sale
Receivers' Sales
Representatives Wanted
Salesmen Wanted
Work Wanted
Etc., Etc., Etc.

WHAT AND WHERE TO BUY

Equipment, Apparatus and Supplies Used by the Electric Railway Industry with Names of Manufacturers and Distributors Advertising in this Issue

Advertising Agencies
Doyle Kitchen & McCormick

Advertising, Street Car
Collier, Inc., Barron G.

Air Brakes
Westinghouse Air Brake Co.

Air Springs
Cleveland Pneumatic Tool Co.

Anchors, Guy
Elec. Service Supplies Co.
Ohio Brass Co.
Westinghouse E. & M. Co.

Armature Shop Tools
Elec. Service Supplies Co.

Automatic Return Switch Stands
Ramapo Ajax Corp.

Automatic Safety Switch Stands
Ramapo Ajax Corp.

Axles
Bethlehem Steel Co.
Brill Co., The J. G.
Carnegie Steel Co.
Illinois Steel Co.
Johnson & Co., J. R.
National Ry. Appliance Co.
Westinghouse E. & M. Co.

Axles, Carbon Vanadium
Johnson & Co., J. R.

Axles, Front
Shuler Axle Co.

Axles, Steel
Bethlehem Steel Co.
Carnegie Steel Co.
Johnson & Co., J. R.
Ludlum Steel Co.

Babbit Metal
Johnson & Co., J. R.

Badges and Buttons
Elec. Service Supplies Co.
International Register Co.

Barges, Steel
American Bridge Co.

Batteries, Dry
Nichols Lintern Co.

Bearings and Bearing Metals
Brill Co., The J. G.
General Electric Co.
Westinghouse E. & M. Co.

Bearings, Center and Roller Side
Stucki Co., A.

Bearings, Roller
Timken Roller Bearing Co.

Bells & Buzzers
Consolidated Car Heating Co.

Bells and Gongs
Brill Co., The J. G.
Elec. Service Supplies Co.

Benders, Rail
Railway Trackwork Co.

Bodies, Bus
Cummings Car & Coach Co.
Graham Bros.

Body Material, Haskelite and Plymetl
Haskelite Mfg. Corp.

Boilers
Babcock & Wilcox Co.

Bolts and Nuts, Track
Illinois Steel Co.

Bond Testers
American Steel & Wire Co.
Electric Service Supplies Co.

Bonding Apparatus
American Steel & Wire Co.
Electric Railway Improvement Co.
Elec. Service Supplies Co.
Ohio Brass Co.
Railway Trackwork Co.
Una Welding & Bonding Co.

Bonds, Rail
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Electric Railway Improvement Co.
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Ohio Brass Co.
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Westinghouse E. & M. Co.

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Elec. Ry. Equipment Co.
Elec. Service Supplies Co.
Hubbard & Co.
Ohio Brass Co.

Brake Adjusters
Brill Co., The J. G.
National Ry. Appliance Co.
Westinghouse Tr. Br. Co.

Brake Shoes
Brill Co., The J. G.

Brakes, Brake Systems and Brake Parts
Brill Co., The J. G.
General Electric Co.
National Brake Co.
Westinghouse Tr. Br. Co.

Bridges, Steel
American Bridge Co.

Brushes, Carbon
General Electric Co.
Jeandron, W. J.
Le Carbone Co.
Westinghouse E. & M. Co.

Buildings, Steel
American Bridge Co.

Bulkheads
Haskelite Mfg. Corp.

Bunkers, Coal
American Bridge Co.

Bus Seats
Hale-Kilburn Co.

Buses, Motor
Brill Co., The J. G.
Cummings Car & Coach Co.
International Motor Co.
Mack Trucks, Inc.
Studebaker Corp.
Yellow Truck & Coach Mfg. Co.

Bushings, Case Hardened and Manganese
Brill Co., The J. G.

Cables. (See Wires and Cables)

Cambric Tapes, Yellow and Black Varnish
Irvington Varnish & Ins. Co.

Carbon Brushes (See Brushes, Carbon)

Car Lighting Fixtures
Elec. Service Supplies Co.

Car Panel Safety Switches
Consolidated Car Heat. Co.
Westinghouse E. & M. Co.

Car Wheels, Rolled Steel
Bethlehem Steel Co.

Cars, Dump
Brill Co., The J. G.
Differential Steel Car Co.

Cars, Gas, Rail
Brill Co., The J. G.

Cars, Passenger, Freight, Express, etc.
American Car Co.
Brill Co., The J. G.
Cummings Car & Coach Co.
Kuhlman Car Co., G. C.
National Ry. Appliance Co.
Wason Mfg. Co.

Cars, Second Hand
Electric Equipment Co.

Cars, Self-Propelled
Brill Co., The J. G.
General Electric Co.

Castings, Gray Iron and Steel
American Bridge Co.
American Steel Foundries
Wm. Wharton, Jr. & Co.

Catchers and Retrievers, Trolley
Elec. Service Supplies Co.
Ohio Brass Co.
Wood Co., Chas. N.

Catenary Construction
Archbold-Brady Co.

Ceiling Car
Haskelite Mfg. Corp.
Pantasote Co., Inc.

Ceilings, Plywood, Panels
Haskelite Mfg. Corp.

Change Carriers
Cleveland Fare Box Co.
Electric Service Supplies Co

Circuit-Breakers
General Electric Co.
Westinghouse E. & M. Co.

Clamps and Connectors for Wires and Cables
Elec. Ry. Equipment Co.
Elec. Ry. Improvement Co.
Elec. Service Supplies Co.
General Electric Co.
Hubbard & Co.
Ohio Brass Co.
Westinghouse E. & M. Co.

Cleaners and Scrapers Track (See also Snow-Plows, Sweepers and Brooms)
Brill Co., The J. G.
Ohio Brass Co.

Cleaters and Sockets
General Electric Co.

Coil Banding and Winding Machines
Elec. Service Supplies Co.
Westinghouse E. & M. Co.

Coils, Armature and Field
General Electric Co.
Westinghouse E. & M. Co.

Coils, Choke and Kicking
Elec. Service Supplies Co.
General Electric Co.
Westinghouse E. & M. Co.

Coin Counting Machines
Cleveland Fare Box Co.
International Register Co.

Coin Sorting Machines
Cleveland Fare Box Co.

Coin Wrappers
Cleveland Fare Box Co.

Commutator Slotters
Elec. Service Supplies Co.
General Electric Co.
Westinghouse E. & M. Co.
Wood Co., Chas. N.

Commutator Truing Devices
General Electric Co.

Commutators or Parts
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General Electric Co.
Westinghouse E. & M. Co.

Compressors, Air
General Electric Co.
Westinghouse Tr. Br. Co.

Condensers
General Electric Co.
Westinghouse E. & M. Co.

Condensor Papers
Irvington Varnish & Ins. Co.

Connectors, Solderless
Westinghouse E. & M. Co.

Connectors, Trailer Car
Consolidated Car Heat. Co.
Elec. Service Supplies Co.
Ohio Brass Co.

Controllers
Amer. Brown Boveri Elec. Corp.

Controllers or Parts
General Electric Co.
Westinghouse E. & M. Co.

Controller Regulators
Elec. Service Supplies Co.

Controlling Systems
General Electric Co.
Westinghouse E. & M. Co.

Converters, Rotary
Amer. Brown Boveri Elec. Corp.
General Electric Co.
Westinghouse E. & M. Co.

Conveying & Hoisting Machinery
American Bridge Co.

Copper Wire
American Brass Co.
Amer. Steel & Wire Co.
Anaconda Copper Mining Co.

Copper Wire Instruments, Measuring, Testing and Recording
American Brass Co.
American Steel & Wire Co
Anaconda Copper Mining Co.

Cord, Bell, Trolley, Register
Amer. Steel & Wire Co.
Brill Co., The J. G.
Elec. Service Supplies Co.
International Register Co.
Roebling's Sons Co., John A.
Samson Cordage Works

Cord Connectors and Couplers
Elec. Service Supplies Co.
Samson Cordage Works
Wood Co., Chas. N.

Couplers, Car
American Steel Foundries
Brill Co., The J. G.
Ohio Brass Co.
Westinghouse Tr. Br. Co.

Cranes, Hoists & Lifts
Electric Service Supplies Co.

Cross Arms (See Brackets)

Crossing Foundations
International Steel Tie Co.

Crossings
Ramapo Ajax Corp.
Wm. Wharton, Jr. & Co.

Crossings, Frogs & Switches
Ramapo Ajax Corp.
Wm. Wharton, Jr. & Co.

Crossings, Manganese
Bethlehem Steel Co.
Ramapo Ajax Corp.
Wm. Wharton, Jr. & Co.

Crossings, Track (See Track Special Work)

Crossings, Trolley
Ohio Brass Co.
Westinghouse E. & M. Co.

Curtains & Curtain Fixtures
Brill Co., The J. G.
Morton Mfg. Co.
Pantasote Co., Inc.

Dealer's Machinery & Second Hand Equipment
Elec. Equipment Co
Sachsenmaier Co., George

Dealer Second Hand Rails
Electric Equipment Co.

Derailing Devices (See also Track Work)

Derailing Switches
Ramapo Ajax Corp.

Destination Signs
Elec. Service Supplies Co.

Detective Service
Wish-Service, P. Edward

Door Operating Devices
Brill Co., The J. G.
Consolidated Car Heating Co.
Nat'l Pneumatic Co., Inc.

Doors & Door Fixtures
Brill Co., The J. G.
General Electric Co.
Hale-Kilburn Co.
Morton Mfg. Co.

Doors, Folding Vestibule
Nat'l Pneumatic Co., Inc.

Drills, Track
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Electric Service Supplies Co.
Ohio Brass Co.

Dryers, Sand
Electric Service Supplies Co.
Ohio Brass Co.
Westinghouse E. & M. Co.

Ears
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Ohio Brass Co.
Westinghouse E. & M. Co.

Electric Grinders
Railway Trackwork Co.

Electric Transmission Towers
American Bridge Co.

Electrical Wires and Cables
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Amer. Steel & Wire Co.
John A. Roebling's Sons Co.

Electrodes, Carbon
Railway Trackwork Co.
Una Welding & Bonding Co.

Electrodes, Steel
Railway Trackwork Co.
Una Welding & Bonding Co.

Engineers, Consulting, Contracting and Operating
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Beeler, John A.
Buchanan & Layng Corp.
Bylesby & Co., H. M.
Day & Zimmermann, Inc.
Ford, Bacon & Davis
Hemphill & Wells
Holst, Engelhardt W.
Jackson, Walter
Kelker & DeLeuw
McClellan & Junkersfeld
Richey, Albert S.
Sanderson & Porter
Stevens & Wood
Stone & Webster
White Eng. Corp., The J. G.

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Westinghouse E. & M. Co

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Nat'l Ry. Appliance Co.
Perey Mfg. Co.

Fare Registers
Electric Service Supplies Co

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Amer. Steel & Wire Co.

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Consolidated Car Fender Co.
St. Louis Car Co.
Star Brass Works
Wood Co., Chas. N.

Fibre and Fibre Tubing
Westinghouse E. & M. Co.

Field Coils (See Coils)

Flangeway Guards, Steel
W. S. Godwin Co., Inc.

Flaxlinum Insulators
National Railway Appliance Co.

Floodlights
Electric Service Supplies Co.

Floor, Sub
Haskelite Mfg. Corp

Floors
Haskelite Mfg. Corp.

Forgings
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Carnegie Steel Co.

Frogs & Crossings, Tee Rail
Bethlehem Steel Co.
Ramapo Ajax Corp.
Wm. Wharton, Jr. & Co.

Frogs, Track (See Track Work)

Frogs, Trolley
Electric Service Supplies Co
Ohio Brass Co.
Westinghouse E. & M. Co.

Furnaces, Electric
Amer. Brown Boveri Elec. Corp.

Furnaces, Electric, Steel Melting
American Bridge Co.

Funnell Castings
Wm. Wharton, Jr. & Co.

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General Electric Co.
Westinghouse E. & M. Co.

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General Electric Co.

Gaskets
Westinghouse Tr. Br. Co.

Gas-Electric Cars
General Electric Co.
Westinghouse E. & M. Co.

Gas Producers
Westinghouse E. & M. Co.

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Brill Co., The J. G.

Gauges, Oil and Water
Ohio Brass Co.

Gear Blanks
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Brill Co., The, J. G.
Carnegie Steel Co.

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Chillingworth Mfg. Co.
Electric Service Supplies Co.
Westinghouse E. & M. Co.

Gears and Pinions
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Electric Service Supplies Co.
General Electric Co.
Nat'l Ry. Appliance Co.
Nuttall Co., R. D.
Tool Steel Gear & Pinion Co.

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General Electric Co.

Generators
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General Electric Co.
Westinghouse E. & M. Co.

Girder Rails
Bethlehem Steel Co.
Lorain Steel Co.

Gongs (See Bells and Gongs)

Greases (See Lubricants)

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Railway Trackwork Co.

Grinders, Portable
Railway Trackwork Co.

Grinders, Portable Electric
Railway Trackwork Co.

Grinding Bricks and Wheels
Railway Trackwork Co.

Guard Rail Clamps
Ramapo Ajax Corp.
Wm. Wharton, Jr. & Co.

Guard Rails, Tee Rail & Manganese
Ramapo Ajax Corp.
Wm. Wharton, Jr. & Co.

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Elec. Service Supplies Co
Ohio Brass Co.

Harps, Trolley
Elec. Service Supplies Co
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Star Brass Works

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Elec. Service Supplies Co.
General Electric Co.
Ohio Brass Co.

Headlining
Haskelite Mfg. Corp.
Pantasote Co., Inc.

Heaters, Car (Electric)
Consolidated Car Heating Co.
Gold Car Heat. & Ltg. Co.
Nat'l Ry. Appliance Co.
Smith Heater Co., Peter

Heaters, Car, Hot Air and Water
Smith Heater Co., Peter

Heaters, Car Stove
Smith Heater Co., Peter

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Railway Trackwork Co.
Una Welding & Bonding Co.

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Hose, Pneumatic
Westinghouse Traction Brake Co.

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(Continued on page 52)

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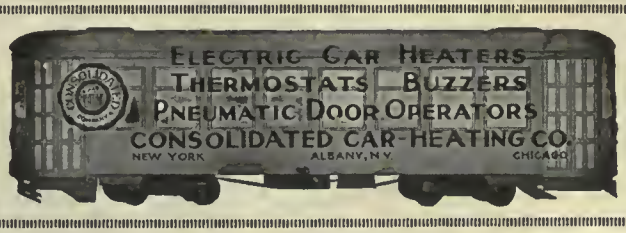
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Jacks (See also Cranes, Hoists and Lifts)
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National Ry. Appliance Co.

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Universal Lubricating Co.

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Manganese Steel Guard Rails
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Wm. Wharton, Jr. & Co.

Manganese Steel, Special Track Work
Bethlehem Steel Co.
Wm. Wharton, Jr. & Co..

Manganese Steel Switches, Frogs & Crossings
Bethlehem Steel Co.
Ramapo Ajax Corp.
Wm. Wharton, Jr. & Co.

Meters (See Instruments)

Motor Generators
Amer. Brown Boveri Elec. Corp.

Motor and Generator Sets
General Electric Co.

Motor Buses (See Buses, Motor)

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Wood Co., Chas. N.

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Hubbard & Co.

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Omnibuses (See Buses, Motor)

Oxy-Acetylene (See Cutting Apparatus, Oxy-Acetylene)

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Irvington Varnish & Ins. Co.

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General Electric Co.
Wood Co., Chas. N.

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Pins, Case Hardened, Wood and Iron
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Westinghouse Tr. Brake Co.

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Plates for Tee Rail Switches
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Nat'l Ry. Appliance Co.

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Ohio Brass Co.

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Hubbard & Co.

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Elec. Ry. Equipment Co.
Hubbard & Co.

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International Creosoting & Construction Co.

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International Creosoting & Construction Co.
Naugle Pole & Tie Co.

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Bell Lumber Co.
Electric Service Supplies Co.
Nuttall Co., R. D.

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Electric Service Supplies Co.

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Okonite-Callender Cable Co., Inc.

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Power Saving Devices
National Ry. Appliance Co.

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Ohio Brass Co.
Westinghouse E. & M. Co.
Westinghouse Traction Brake Co.

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International Register Co.
Wood Co., Chas. N.

Rail Braces & Fastenings
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Rail Filler
Philip Carey Co., The

Rail Grinders (See Grinders)

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Illinois Steel Co.
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Rail Joints—Welded
Lorain Steel Co.
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Rail Welding
Metal & Thermit Corp.
Railway Trackwork Co.
Una Welding & Bonding Co.

Rails, Relaying
Hyman-Michaels Co.

Rails, Steel
Bethlehem Steel Co.
Carnegie Steel Co.
Illinois Steel Co.
Ludlum Steel Co.

Rail Welding
Metal & Thermit Corp.
Railway Trackwork Co.
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Rattan
Brill Co., The J. G.
Cummings Car & Coach Co.
Elec. Service Supplies Co.
Hale-Kilburn Co.

Rectifiers, Mercury
Amer. Brown Boveri Elec. Corp.

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Brill Co., The J. G.
Electric Service Supplies Co.
International Register Co.
Rooke Automatic Register Co.

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American Steel & Wire Co.
Bethlehem Steel Co.
Carnegie Steel Co.

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Westinghouse E. & M. Co.

Retrievers, Trolley (See Catchers and Retrievers, Trolley)

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Westinghouse E. & M. Co.

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Pantasote Co., Inc.

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Haskelite Mfg. Corp.

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Electric Service Supplies Co.
Nichols-Lintern Co.
Ohio Brass Co.

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St. Louis Car Co.

Sash Fixtures, Car
Brill Co., The J. G.

Sash Metal Car Window
Hale-Kilburn Co.

Scrapers, Track (See Cleaners and Scrapers, Track)

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Haskelite Mfg. Corp.
Pantasote Co., Inc.

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Nuttall Co., R. D.

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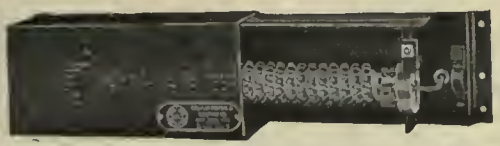
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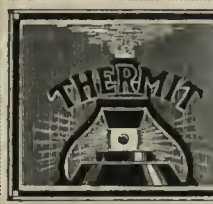
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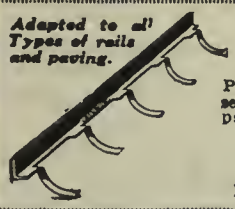


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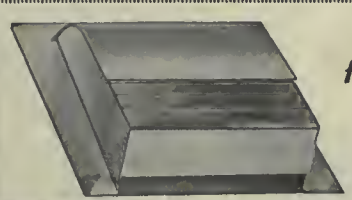
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ALPHABETICAL INDEX TO ADVERTISEMENTS

A

Page

Allison Co., J. E. 25
American Brass Co., The 51
American Bridge Co. 48
American Car Co. 55
American Electrical Works 51
American Steel Foundries 8
American Steel & Wire Co. 48
Anaconda Copper Mining Co. 51
Archbold-Brady Co. 24

B

Babcock & Wilcox Co. 51
Beeler Organization 24
Bell Lumber Co. 25
Bethlehem Steel Co. 48
Bridgeport Brass Co. 10
Brill Co., The J. G. 55
Buchanan & Layng Corp. 24
Byllesby Engineering & Management Corp. 24

C

Cameron Electrical Mfg. Co. 25
Carey Company, The Philip. 32-33
Carnegie Steel Co. 48
Century Rubber Works ..... Insert 38
Chillingworth Mfg. Co. 53
Cleveland Fare Box Co. 53
Cleveland Pneumatic Tool Co., The 28
Cleveland Tanning Co. 30
Collier, Inc., Barron G. ..... Front Cover
Consolidated Car Fender Co. 53
Consolidated Car Heating Co. 51
Cummings Car & Coach Co. 21

D

Day & Zimmermann, Inc. 24
Dayton Mechanical Tie Co. 40-41
Differential Steel Car Co., The. 46
Doyle, Kitchen & McCormick, Inc. 27

E

Page

Electric Equipment Co. 49
Electric Ry. Equipment Co. 34
Electric Railway Improvement Co., The 25
Electric Service Supplies Co. 9

F

Ford, Bacon & Davis 24
"For Sale" Ads. 49

G

General Electric Co. ..... 22, Back Cover
Godwin Co. Inc., W. S. 53
Gold Car Heating & Ltg. Co. 53
Goodyear Tire & Rubber Co., The 29

H

Hale-Kilburn Co. 53
Haskelite Mfg. Corp. ..... Insert 35
"Help Wanted" Ads. 49
Hemphill & Wells 24
Holst, Englehardt W. 24
Hubbard & Co. 51

I

Illinois Steel Co. 20
International Creosoting & Construction Co. 39
International Motor Co. 16-17
International Register Co. 46
International Steel Tie Co., The. 7
Irvington Varnish & Insulator Co. 51

J

Jackson, Walter 24
Jeandron, W. J. 46
Johnson & Co., Inc., J. R. 25

K

Page

Kelker, DeLeuw & Co. 24
Kelly-Springfield Tire Co. 19
Kuhlman Car Co. 55

L

LeCarbone Co. 46
Lorain Steel Co. 48
Ludlum Steel Co. 48

M

Mack Trucks, Inc. 16-17
McClellan & Junkersfeld 24
McGraw-Hill Book Co., Inc. 44
McGraw-Hill Publishing Co., Inc., 42-43
Metal & Thermit Corp. 53
Miller Trolley Shoe Co. 45
Morton Mfg. Co. 53

N

Nachod and U. S. Signal Co. 53
National Brake Co. 23
National Pneumatic Co., Inc. 15
National Ry. Appliance Co. 46
Naugle Pole & Tie Co. 25
Nichols-Lintern Co. 53
Nuttall Co., R. D. 44

O

Ohio Brass Co. 5
Okonite-Callender Cable Company, Inc., The 51
Okonite Co., The 51

P

Pantasote Co., Inc. 47
Perey Mfg. Co., Inc. 51
Phoenix Ice Machine Co., The. 47
Positions Wanted and Vacant. 49

R

Page

Railway Track-work Co. 4
Railway Utility Co. 53
Ramapo Ajax Corp. 53
Richey, Albert S. 24
Roebling's Sons Co., John A. 25
Rooke Automatic Register Co. 46

S

Sachsenmaier Co., George 49
Samson Cordage Works 53
Sanderson & Porter 24
Searchlight Section 49
Shuler Axle Co. 25
Smith Heater Co., Peter 53
Star Brass Works 46
Stevens & Wood, Inc. 24
Stone & Webster 24
Stucki Co., A. 53
Studebaker Corporation of America, The ..... Insert 36-37

T

Timken Roller Bearing Co., The. 31
Tool Steel Gear & Pinion Co. 47

U

Una Welding & Bonding Co. 53
Universal Lubricating Co. 46

W

"Want" Ads. 49
Wason Mfg. Co. 55
Westinghouse Elec. & Mfg. Co. 2
Westinghouse Traction Brake Co. 6
Wharton, Jr. & Co., Inc., Wm. 48
"What and Where to Buy" 50-52-54
White Eng. Corp., The J. G. 24
Wish Service, The P. Edw. 25
Wood Co., Chas. N. 51

Y

Yellow Truck Coach Mfg. Co., Insert 11-12-13-14

WHAT AND WHERE TO BUY

(Continued from page 52)

Ventilators, Car
Brill Co., The J. G.
Consolidated Car Heating Co.
Nat'l Ry. Appliance Co.
Nichols-Lintern Co.
Railway Utility Co.

Vestibule Linings
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Wheel Guards (See Fenders and Wheel Guards)

Wheel Presses (See Machine Tools)

Wheels, Car, Steel & Steel Tire
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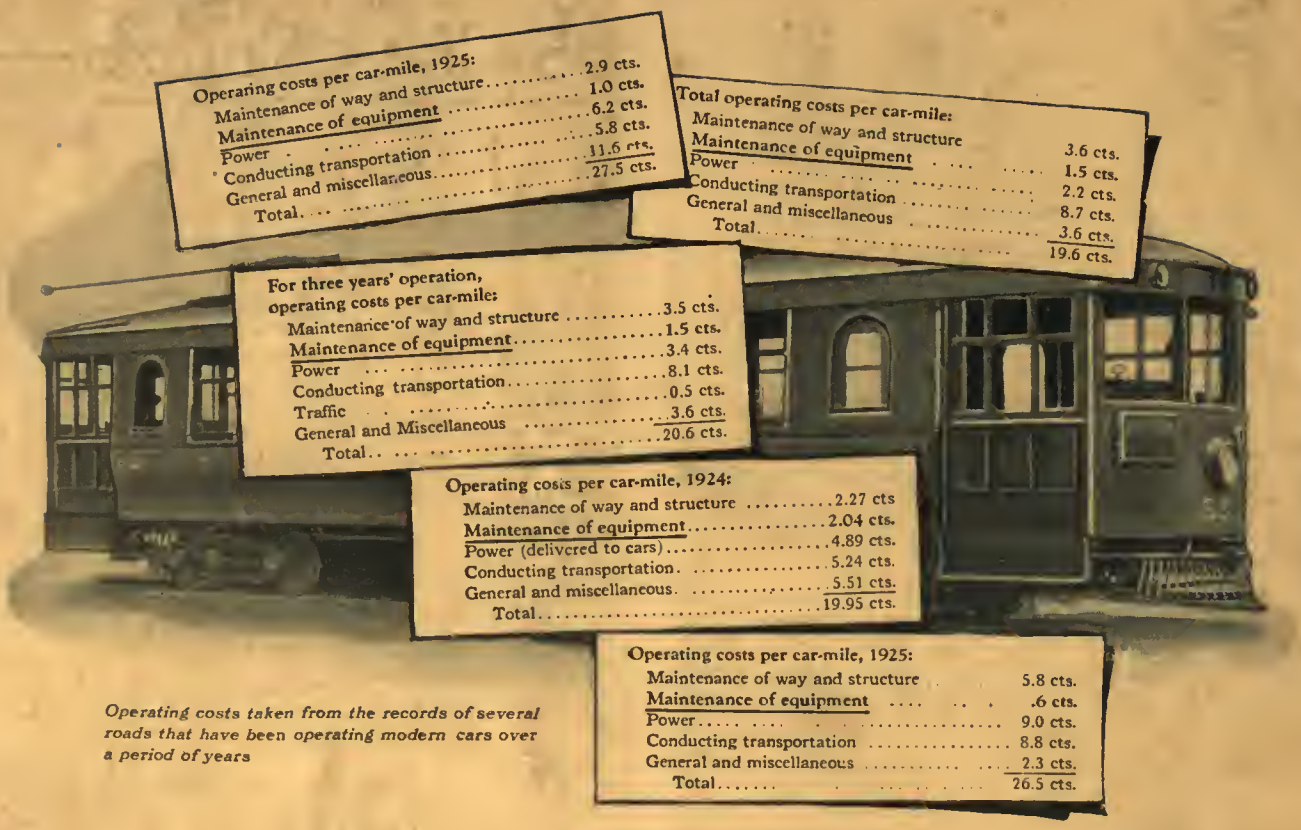


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